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**Improved Breech-loading Cannon.**

We publish this week an illustration of a new breech-loading gun devised by Mr. James H. Coon, of Deposit, N. Y. The object of the inventor has been to lighten the labor of the gunner and to dispense with the usual gun crew : their place being supplied by machinery. This weapon is essentially a self-acting one ; all the operations being performed by power, and the periods of them severally regulated by well-known mechanical devices. The gun is depressed at the breech (it being in two parts) and the charge is elevated to the bore, rammed home, and the parts restored to their proper places by the mechanism before mentioned ; one man only being required for this duty, with guns of the largest class. The following explanation will render the principal points of this invention clear to every one :—

*Fig. 1*

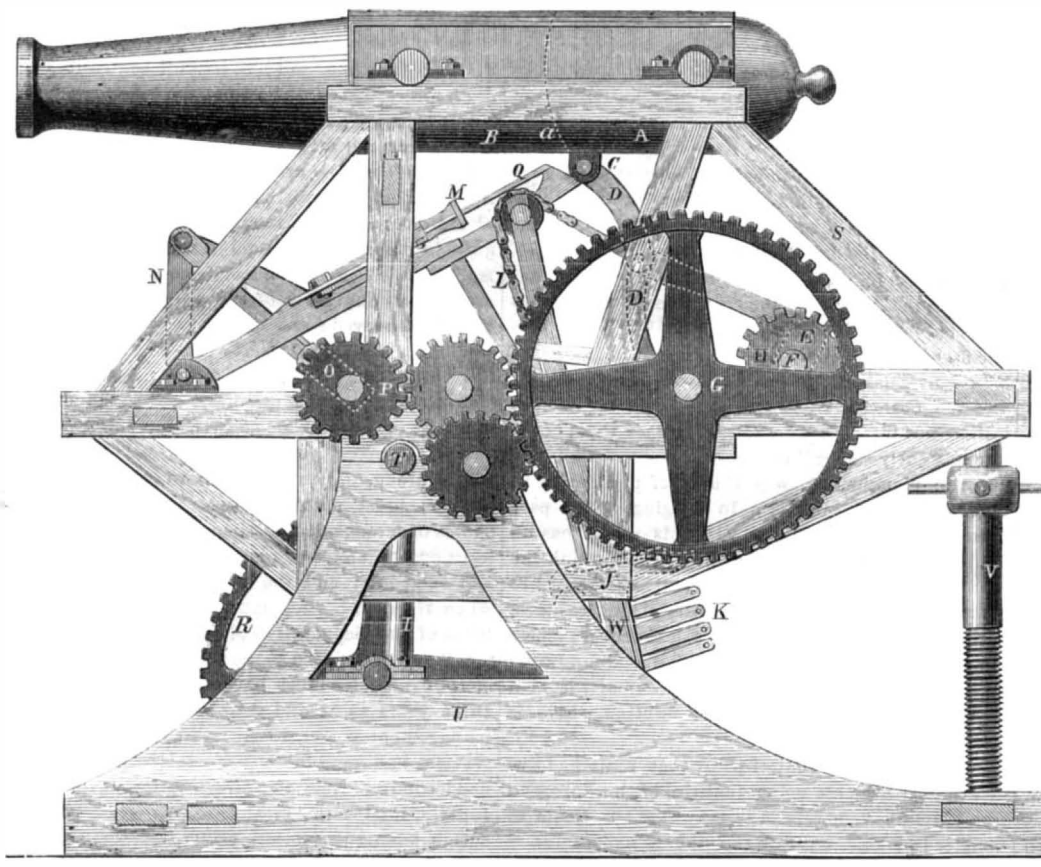
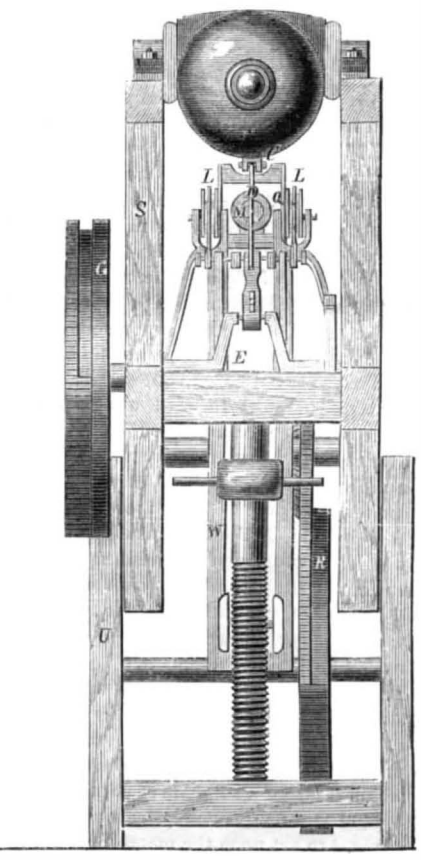



*Fig. 2*




## COON'S BREECH-LOADING CANNON.

The gun is divided into two parts, A and B, at the line, *a*, Fig. 1 ; the breech end is a lug, C, which has the toggle arms, D, attached ; these arms are worked by the crank, E, on the shaft, F. The large spur-wheel, G, drives this shaft through the pinion, H, meshing into teeth on the inner side of the rim. The motion is communicated from a steam engine through the small pinions by a pair of bevel gears inside the frame, and a universal joint shaft, I, driving the same. It will be seen, therefore, that as the large spur-wheel revolves the toggle arms are operated by the crank, and the muzzle part of the gun is separated from the breech ; the bore of the latter arms at N, and a crank, O, shown in dotted lines behind the pinion, P. A system of slides is provided by which the rammer is guided in its upward movement, and the ends of these slides are seen at Q, having an apparent connection with the lug, C, but which are in reality unconnected with it. The large spur-wheel, R, at the bottom of the frame, meshes into a rack on the frame, so that when the piece recoils with the discharge it can be run forward again by the machinery, and thus be ready for action. The other spur-wheel first mentioned has its periphery cut for three different pinions, and as these are to be driven continuously, the teeth are removed when it is desirable that the motion should cease ; and, although the main driving wheel continues its motion, it does not interfere with the other operations. The frame, S, on which the gun is mounted, swings on a central shaft, T, carried by the lower frame, U ; this frame is to be provided with wheels similar to any ordinary gun-carriage. The elevation is obtained through the usual screw, V, working in a nut at the bottom of the frame. The slides, W, are for the purpose of guiding the lazy tongs in their upward movement. These are the main features of this invention. The several movements are intended, as beforementioned, to obviate manual labor, and dispense with the usual number of men employed about artillery. No cessation takes place in the motions, but they continue so long as the machinery is driven by the main power. The inventor claims that but one man is required to work the largest guns, and that so compact is the space in which the machinery is contained, that it is peculiarly adapted for monitor turrets. Also that mortars may be thus worked to advantage.

A patent for this invention was granted to James H. Coon, of Oxford, N. Y., on Jan. 6, 1863 ; for further information address him at that place.

TEA GROWN IN NEW YORK.—In an account of the Fair of the Little Falls Farmer's Club, we find the following :—"We noticed also a China tea plant, raised by M. L. Sanders. Mr. Sanders said that he had already obtained between five and six pounds from his plants, and they were nearly ready to pick again."

THE OLDEST AMERICAN NEWSPAPER.—The New Hampshire *Gazette*, published at Portsmouth, completed the one hundred and seventh year of its publication with its issue of Oct. 1st. The *Gazette* was started in 1756, and is the oldest newspaper in America.

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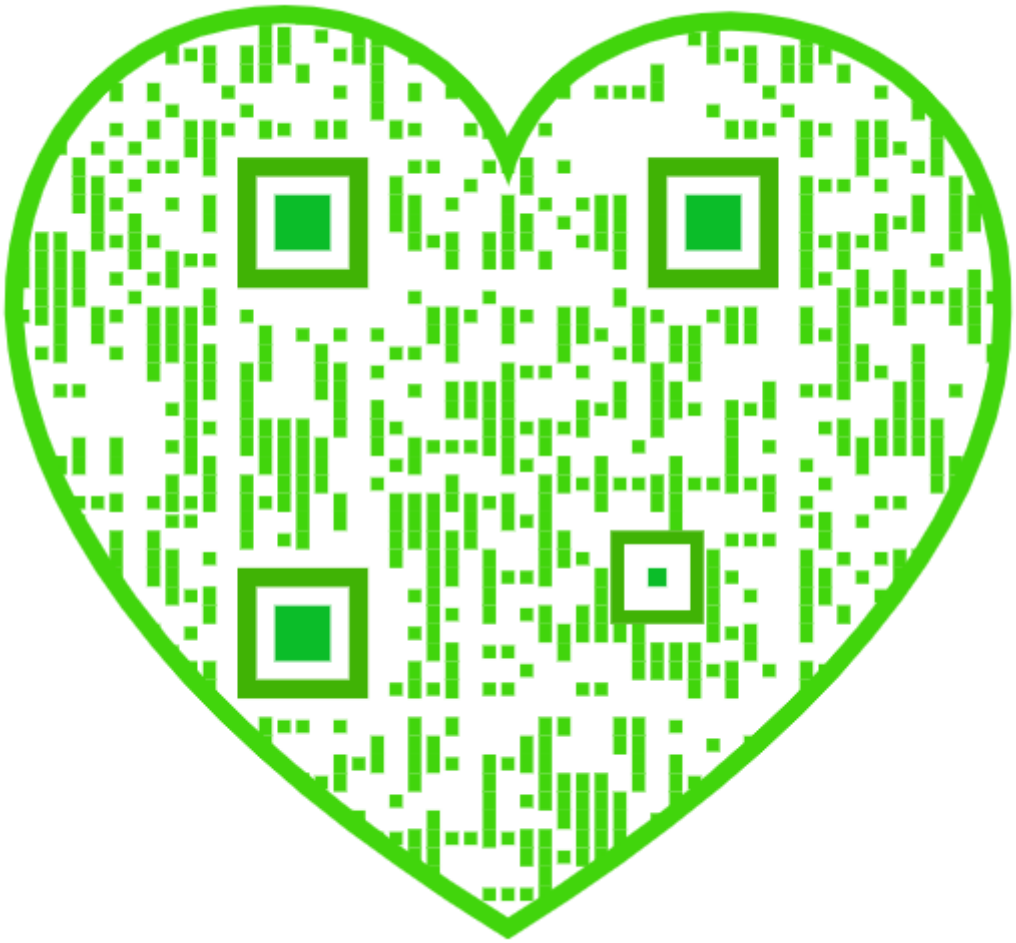

## INVENTIONS AND DISCOVERIES ABROAD.

*Purifying Coal Gas.*—A patent has been taken out by Arthur Warner for purifying gas and removing the sulphur from it by the use of the cinders or oxide of iron, obtained from the puddling and refining furnaces that are employed in the manufacture of iron.

The cinders or oxide of iron obtained from the furnaces of iron-works, are first ground or stamped, and sifted through sieves with holes of about one-eighth to one sixth of an inch square. If they have much dirt or impurities mixed with them, it is desirable that these should be washed out before the cinders are used. The sifted oxides are employed in what are called dry-lime purifiers, or those wherein other oxides of iron are used, and in like manner thereto. They are generally used in a damped state, but this is not essential.

The patentee states that it is found, when the cinders or oxides of iron obtained from the furnaces of iron-works are used for the first time to purify coal-gas, that the sulphuretted hydrogen is not so fully and effectually acted upon as when using hydrated oxide of iron, such as is now very largely employed, and it is only when the former have been further prepared that they do fully and effectually remove that impurity. Hence, it is desirable, when using a quantity of such cinder or oxide for the first time, to combine it with a quantity of other like cinder or oxide, which has been before used, and has been subsequently further prepared by the action of atmospheric air.

After the cinder or oxide above mentioned has been used for the purpose of purifying gas, it is removed from the purifiers and made up into heaps in the open air till the same becomes heated, when the oxide is to be spread and turned over from time to time till it becomes again suitable for use, which will generally be the case in a few days, depending on the state of the atmosphere.

*Harmless Lead Pipes.*—The importance of discovering a really efficient means of preventing the injurious action of lead pipes on water is universally acknowledged, and the experiments of Dr. Crace-Calvert have proved beyond question that no proposition hitherto brought forward has been calculated to remedy the evil complained of. A discovery, however, has now been made, through which the water supplied by leaden pipes may be obtained by the consumer as pure as from the original source. Dr. H. Schwartz, of Breslau, has discovered a means by which the portion of the lead forming the interior surface of the pipe may be converted into an insoluble sulphide, the natural consequence being that the water passing through will be as free from contamination as if glass were used. The means by which Dr, Schwartz effects this conversion are extremely simple. He simply passes a strong solution of the sulphide of an alkali through the pipe to be acted upon, and the process is completed. This solution, which is either a sulphide of potassium or of sodium, is used at a temperature of about 212° Fah., and is allowed to act upon the metal for from ten to fifteen minutes. It is stated that, in practice, the boiling solution of caustic soda and sulphur is found to answer every purpose. If caustic soda and sulphur accomplish the objects stated above, it is one of the most useful discoveries of the age.

*Preventing Boiler Explosions.*—A patent has been obtained by D. Tassin, of Liege, Belgium, for preventing boiler explosions; which must take place in Belgium from a totally different cause than is possible in the United States. The inventor states that "explosions usually occur when the steam engines are at rest, and when the steam is at a mean pressure in the boiler—that is when the stone float can sway or move freely at the least bubbling of the water, and electricity then becomes the cause of the explosion. The stone float of the boiler has an iron clasp extending through its center, suspended by a copper wire. When the water in the boiler is impregnated with acids or alkali, the least movement of the float generates friction between the iron and the copper, and an electric spark is then produced which causes the explosion." To prevent explosions from this cause, the inventor dispenses with the copper wire of the float and employs an iron one as a substitute, from which he asserts an electric spark will not be emitted. There may be a few boilers in the United States in which such floats are used, but we doubt it.

*Preserving Provisions.*—A patent has been applied for by A. H. Remond, of London, for preserving provisions by passing a current of electricity through the cans or cases containing what are called "preserved provisions," after they are sealed up. The electric fluid is made to pass through the case on a fine iron wire; the wire is caused to become red hot by the intensity of the current, and thus the oxygen in the can is said to be consumed, because it will unite with the hot iron wire and form an oxide.

*Treating Skins for Drum Heads.*—To prevent the skins of drum heads from absorbing moisture, A. J. Sax, of Paris, has taken out a patent for coating them with collodion.

*Soldering Tin Vessels.*—A patent has been obtained by A. Forbes, of Aberdeen, Scotland, for soldering tin vessels without employing a soldering-iron When the tin vessels are shaped and their joints brought together to be reunited, he lays on the joint a strip of solder, or a ring of it, according to the shape of the vessel; then sprinkles on it some borax in powder, and melts the solder with a jet of flame from a flexible gas pipe.

*New Lubricating Mixture.*—M. Serbat, Belgium, has patented a mixture composed of 10 parts tallow, lard or oil, dissolved in 100 parts, by weight, of naphthaline, to be employed as a lubricating compound for machinery.

### French Iron-clads.

France and England have each about a baker's dozen of iron-cased ships. It might be difficult to prove which of these powers excels in this department of marine architecture; though it is certain that Louis Napoleon, if not superior, is little behind his formidable rival across the channel. Now, fortunately for our purpose, we find in a letter from Cherbourg (the great naval depot of France), written only last month to the London *News*, evidently from an intelligent observer, what appears like a very plain unprejudiced statement of the condition of the French iron-clad navy. There were at that time in the harbor four of these iron fighting ships, including the *Solferino*, the most powerful in the French navy; also the *Couronne*, *Normandie*, and *Magenta*. No objection was made to an examination of these craft. The unsightly "spur" of the *Solferino*, resembling a gigantic ploughshare, was the chief peculiarity as viewed from the exterior. In judging of the part these vessels are to play in war, this writer has no doubt that the *Solferino*, for example, might sink the best wooden ship in a few minutes; but in regard to sea-going qualities, the practicability of long voyages, with the risk of running short of coal, the consequences of even a slight derangement of the complicated machinery, and the probable condition of the men when the ship is "shut up" for fighting, there is much difference of opinion.

Just here is the essential point that remains to be determined—the sea-going qualities of the European iron-clads—not merely whether they are liable to founder in a gale, but can the stokers and engineers survive the want of ventilation, either when shut up for action or with ports closed in a tempestuous voyage? After making full allowance for exaggerations, there is no doubt that the crew of the *Normandie*, on her voyage to Mexico, suffered terribly, though it is not probable that one-half of them died, as commonly reported. Of course other French iron-clads, like the *Flandre*, her exact counterpart, are liable to the same defects, though the Emperor is said to be bringing all the aids of science and skill to secure the highest perfection. According to the professional opinion prevailing in Cherbourg, says the *News* correspondent, they are "far indeed short of perfection yet." All these vessels have breech-loading rifled guns, to avoid needlsss exposure of the men to the enemy's fire.

It is useless to deny that the French have a splendid navy, worthy of the highest admiration. The resources of an Empire have been hard taxed for its completion, and every ship is handled by men trained to a high state of discipline, and skilled in seamanship and gunnery. Yet the more we inquire into its effective strength, and the means at our command wherewith to resist, and if need be, overwhelm it with discomfiture, the more we are satisfied that the navy of the United States will soon be able to challenge a comparison.—*Exchange.*

### Rules for the Admission of Engineers to the United States Navy.

Frequent inquiry having been made of us respecting the pay of engineers in the service of the United States Navy, we take this opportunity of presenting a few facts upon the subject. We have published the substance of the appended matter before, but deem its reproduction at this time of interest:—

"Before persons can be appointed Assistant Engineers in the Navy, they must have passed a satisfactory examination before a board of at least three Engineers, designated at such times as the wants of the service require. Applications for permission to appear before such board must be made in writing to the Secretary of the Navy, stating the age of the applicant, and be accompanied by satisfactory testimonials as to good moral character, correct habits, and sound constitution. The application will be registered, and when a board next meets, permission will be sent to the applicant, stating the time and place of meeting of the board.

"In the examination for a *Third Assistant Engineer*, the candidate must be able to describe all the different parts of ordinary condensing and non-condensing engines, and explain their uses and their mechanical operation; to explain the manner of putting engines in operation, how to regulate and modify their action, and the manner of guarding against danger from the boilers, by the means usually applied to them for that purpose. He will be expected to write a fair, legible hand, and to be well acquainted with Arithmetic, and the Mensuration of Surfaces and Solids of the regular forms. He must not be less than twenty nor more than twenty-six years of age.

"Candidates for promotion to the rank of *Second Assistant Engineer*, must have served at least two years as Third Assistants in the management of steam engines in the Navy in actual service: must produce testimonials of good conduct from the Commanders and Senior Engineers of the vessels in which they may have served; and must pass a satisfactory examination upon the subjects and to the extent prescribed for Third Assistants; they must likewise be able to explain the peculiarities of the different kinds of valves; the construction of expansion valves, the manner of their operation, the remedies which are usually resorted to to check foaming in boilers; must possess a knowledge of the usual causes of derangement in the operation of air-pumps, force-pumps, and feed-pipes, the proper preventives and remedies; and the mode of cleaning boilers when required. They must have a general knowledge of the Mensuration of Surfaces and Solids.

"Before promotion to the rank of *First Assistant Engineer*, candidates must have been employed at least three years as Second Assistant Engineers in the management of steam engines in the Navy in actual service, and produce testimonials of character and good conduct from their former Commanders and superior Engineers; must pass a satisfactory examination upon the subjects prescribed for Third and Second Assistants, the mechanical powers, the general principles of the operation of steam engines, the causes of, and the best means of removing, the different kinds of deposits and incrustations to which boilers are exposed, and be able to furnish a working sketch or drawing of different parts of engines and boilers; to superintend their construction, and determine upon their accuracy and fitness for use.

"Promotions to the grade of *Chief Engineer* are to be made after the candidates have served for two years as First Assistant Engineers in the management of steam engines in the Navy in sea service, and have been examined upon any of the subjects specified for Assistants which the board may deem expedient; and after thep shall have satisfied the board of their previous good conduct and character; of their sufficient knowledge of Mechanics and Natural Philosophy; of the forms, arrangements, and principles of different kinds of steam engines, boilers, propellers, and their various dependencies, which have been successfully applied to steam vessels, and their alleged relative advantages for sea or river service, and shall have attained twenty-six years of age.

"The pay of Engineers is established by act of Congress, approved on the 1st of June, 1860, and is

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as follows :—Chief Engineers (on duty)—for first five years after date of commission, $1,800; for second five years after date of commission, $2,200; for third five years after date of commission, $2,450; after fifteen years from date of commission, $2,600 On leave or waiting orders—for first five years after date of commission, $1,200; for second five years after date of commission, $1,300; for third five years after date of commission, $1,400; after fifteen years from date of commission, $1,500.

"First Assistant Engineers—on duty, $1,250; on leave or waiting orders, $900.

"Second Assistant Engineers—on duty, $1,000; on leave or waiting orders, $750.

"Third Assistant Engineers—on duty, $750; on leave or waiting orders, $600."

## MISCELLANEOUS SUMMARY.

ICELAND.—This island which has a population of about seventy thousand, is under the government of Denmark. The language spoken in Iceland is the old Scandinavian, closely akin to the Saxon, with no admixture of Greek or Latin roots. It has, singularly enough, a literature 900 years old. There are four presses on the island, and four newspapers. About 60 volumes are issued in a year. There are colleges and academies of medicine there, and common schools. But most of the education is domestic in its character. The fathers teach the children so effectually, that a young Iceland boy or girl of eight years old cannot be found unable to read and write. Wandering minstrels, like those of the old time in Scotland and Germany, are still to be found traversing the country, and dropping in on families happy to receive them, who gladly give them a night's supper and lodging in exchange for their lay. The Icelandic Church is Lutheran. There are 199 churches on the island, with 280 clergymen.

EXPIRED PATENT FOR PURIFYING GAS.—On the 24th of this month, the English patent of F. C. Hills, for the purifying of coal gas by the use of hydrated per-oxide of iron, expired and became public property. The profits which have accrued to the patentee from this patent amounted to about half a million of dollars, although perhaps no patent ever issued in England caused so much litigation. This was owing to its similarity to other patents which had been previously issued. The hydrated per-oxide of iron is employed as a substitute for lime, in purifying the gas. It absorbs the sulphuric acid that passes over with the gas from the retort, and when fully saturated its sulphur may be expelled by heat and exposure to the atmosphere, so that it can be used repeatedly for purifying.

CORRECTION —GALVANIC BATTERIES.—In the illustrated description given of Hill's improved galvanic battery, for telegraph lines, on page 184, current volume of the SCIENTIFC AMERICAN, it is stated that such a battery of 200 cups is fully equal to the Grove's battery formerly used on the line. It should have stated that "this battery took the place of 145 cups Grove's battery, charging the Chicago termini of nine lines radiating to Green Bay, Dubuque, Clinton, Iowa, Muscatine, Keokuk, St. Louis and Cairo." The inventor desires us to make this statement, as readers may have inferred that his battery was claimed to be the stronger of the two.

THE FLAX COTTON EXPERIMENTS.—The *Providence* (R. I.) *Press*, alluding to the $20,000 appropriated by Congress to make experiments with flax cotton, and intrusted to the Commissioner of Agriculture, censures that officer for not co-operating with the Rhode Island Society for the Encouragement of Industry. It would seem that the appropriation was made at the solicitation of members of this society, after they had made experiments and devoted considerable attention to the subject. Much useful information had thus been acquired by them, which would have been valuable in conducting the new experiments.

DANGEROUS NAVIGATION.—The Russians are placing torpedoes in the Baltic, and have issued notices to navigators to observe certain marks in order to avoid them, flying blue flags on the danger posts. Some accidents have already occurred, and a short time since a Dutch vessel was destroyed by one of these exploding machines, which had been inadvertently left in the fairway since the last war.

HEAT OF THE EARTH.—The increase of the earth's temperature, as we descend, below the surface is a subject which possesses great scientific interest, as affecting the computed thickness of the crust which covers the molten mass assumed to constitute the interior of the earth, and it is also of great practical importance as determining the depth at which it would be possible to pursue the working of coal and other minerals. The deepest coal mine in the world is the Monkwearmouth Colliery, in England, which reaches a depth of 1,800 feet below the surface of the ground, and nearly as much below the level of the sea. The observed temperature of the strata at this depth agrees pretty closely with what has been ascertained in other localities, and shows that the increase takes place at the rate of 1° Fah. to about 60 feet of depth. Assuming the temperature of subterranean fusion to be 3,000°, and that the increase of heat at greater depths continues uniform (which, however, is by no means certain), the thickness of the film which separates us from the fiery ocean beneath will be about 34 miles.

A NEW cure for burns is noticed as infallible by *Les Mondes:* The affected part is kept under water in a basin, or a bath, the negative pole of a Volta-Farradaic apparatus is put in communication with the water, while the positive pole communicates with some part of the body out of the water and near the injury. The patient feels no pain, and the inflammation is subdued, generally in an hour. When the whole person has been in flame, the patient must be put into a bath, with the negative pole in the direction of the feet, and the positive one touching the nape of the neck. Some of the water must be changed every fifteen minutes to prevent it becoming warm.

A PARISIAN physician, considering typhus fever to be a kind of paralysis or asphyxia of the vital functions, occasioned by the inhalation of lethiferous atmosphere, either from a typhoid patient or any other morbid source, admits air freely to the invalid's bedroom, to which plan he attributes many remarkable cures. He says there can be no infection in the open air—fresh air moreover enables a patient to take stimulants which he could not otherwise bear.

THE effects of narcotic poisons seem to be destroyed by pouring cold water on the face and head. A girl, accidentally poisoned in England with laudanum, had had all the usual remedies administered without effect; when cold water was applied, however, she breathed more easily and bled from the nose. The treatment with water being suspended, she relapsed into coma; being resumed she again rallied and in 60 hours was completely recovered.

THE softening of india-rubber to be blown into bladders is effected by sulphuret of carbon, the fumes of which are said to affect the nervous system greatly, producing headache, vertigo, and a kind of delirium which may end in lunacy. Dr. Delpech, of Paris, recommends a glass screen, with holes for the arms, and water-proof sleeves, to be placed between the workman and the table.

HARBOR DEFENSE.—To those correspondents who have forwarded us communications on this subject we would say that we are unable to find room for their several plans and the details of them. Letters on this subject generally come to us much longer than is necessary; correspondents would obtain a hearing much oftener if they made their communications "short, sharp, and decisive."

IRON RAILWAY CARS.—The days of wooden freight cars appear to be numbered on the New York Central Railroad. For the past two years, iron freight cars have been built at Albany, for this road, thin plate iron being used for the purpose. Such cars are fully lighter than those made of wood, and are at the same time more roomy and stronger. They also possess greater durability, and are incombustible.

THE FRENCH ARMY.—An official return shows that the French army, on a peace footing, numbers 412-000 men and 80,000 horses. By calling on the reserves it can be swelled to 700,000.

THE Edinburgh and Glasgow Railway Company of Scotland have recently paid some $205,000 for damages resulting from a collision of trains on that road.

COAL CARRIERS TO LONDON.—The city of London receives its supply of coal chiefly from Newcastle. Formerly these black diamonds were carried by large sailing schooners, but in 1852 iron screw steamers were commenced, and these have driven all the sailing vessels from the route. The screw coal-carrying steamer named the *James Dixon* frequently receives 1,200 tuns of coals in four hours, makes her passage to London in 32 hours; there, by means of hydraulic machinery which Sir William Armstrong invented discharges her cargo in ten hours, returns in 32 hours, and thus completes her voyage in 76 hours. The *James Dixon* made 57 voyages to London in one year, and delivered 62 842 tuns of coal, and this with a crew of only 21 persons. To accomplish this work on the old system, with sailing colliers, would have required 16 ships and 144 hands to man them.

MAGNETIC IRON.—A vein of magnetic iron has recently been discovered in Sweden, which is probably the richest of all the known sources of natural magnets. This vein, which is several feet thick, traverses a mountain formed of minerals more or less magnetic, situated on the left hand of the river Bautusjoki, in latitude 67½ deg., and longitude 39¾ deg. Put in connection with the galvanometer, some of these natural magnets produced a deviation of 10 to 15 degrees, and a very short contact sufficed to convert a piece of iron into a magnet capable of sustaining a weight of 1 pound or 2 pounds Swedish. Natural magnets of great size are easily obtained from this vein.

PETROLEUM AT HAMBURGH.—A decree has been issued in Hamburgh which relaxes the stringent law heretofore in force in that city respecting the storage of American petroleum. The decree ordains that crude petroleum, petroleum naphtha, and petroleum that evaporates into gas at a lower temperature than 30° Reamur (99½° F.) must be, as heretofore, warehoused exclusively in the public stores on the island in the Elbe. Refined petroleum, however, from which no inflammable gases emanate at a temperature under 30° Reamur, may, as is the case with oil of turpentine, be warehoused in the private stores of retailers to the extent of 1000 pounds.

THE Illinois Central Railroad Company has the largest amount of rolling stock of any road in the West. It is at present composed of over 3,000 first-class freight cars, 100 passenger and mail cars, and 150 locomotives, all finished in first-class style and with the latest modern improvements.

P. T. BARNUM is the happy possessor of a five-horned ram, which resides not at the Museum, but at his farm. At a recent cattle show he labeled the animal "An intemperate sheep which has taken at least three horns too much."

THE field of the first Bull Run battle is thickly strewn with flowers, which spring up from the midst of the moldering and rusting medley of that day's horrors.

THE New Bedford papers allude to the great increase in the African palm-oil trade, and advise that the long-closed oil factories of that city be re-opened.

WHITE porcelain reflectors have been added to some of the Paris gas lamps, adding greatly to the light produced.

### Hyperbolical Steamship Speed.

A communication appeared in the New York *Herald* of the 20th inst., and a similar one in the New York *Times* of the 21st, describing the new United States steamship *Idaho*, in which it is stated that the pistons of the engines will have a speed of 11,000 feet per minute; that their stroke is 8 feet; the speed of the vessel will be 17½ miles per hour, the consumption of coals 5 tuns per hour, and 7000 horse power will be developed. This amount of fuel would be less than 1½ pounds per horse power per hour; and the speed of piston given, driving by direct-action a screw of 30 feet pitch—the same as the *Dictator's*—allowing ten per cent for slip, would give the *Idaho* a speed of no less than 209 miles per hour. Allowing the speed of piston to be 1,100 instead of 11,000 feet per minute, the speed of the vessel would be 21 miles per hour. No vessel building in this city will run at the rate of 17½, much less 21 miles per hour with only one and a half pounds of coal per horse power. Four or five pounds will be much nearer the mark.

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## SCIENTIFIC INFORMATION—BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Boiler Explosions.—The following are condensed extracts from a paper by Prof. Airy, the Astronomer-Royal, England :—"In considering the cause of the extensive mischief done by the bursting of a high-pressure steam boiler, it is evident that the small quantity of steam contained in the steam-chamber has very little to do with it. That steam may immediately produce the rupture, but as soon as the rupture is made and some steam escapes, and the pressure on the water is diminished, a portion of the water is immediately converted into steam at a slightly lower temperature and lower pressure, and this in the same way is followed by other steam at a still lower temperature and pressure, and so on, until the temperature is reduced to 212° Fah. and the pressure to 0. Then there remains in the boiler a portion of water at the boiling point, the other portion having gone off in the shape of steam, of continually diminishing pressure. From this it is evident that the destructive energy of the steam, when a certain pressure is shown by the steam-gage, is proportional to the quantity of water in the boiler. By the assistance of Professor Miller, of Cambridge, Messrs. Ransome, of Ipswich, and Mr. George Biddle, I have been able to obtain a result which I believe to be worthy of every confidence. I will first state, as the immediate result of Mr. Biddle's experiments, that when there was in the boiler of a small locomotive 22 cubic feet of water, at the pressure of 60 pounds to the square inch, and the fire was raked out and the steam allowed to escape gently with perfect security against priming, the quantity of water which passed off before the pressure was reduced to 0 was 2¾ cubic feet, or one-eighth of the whole. In regard to the use made of Professor Miller's theory, that gentleman had succeeded in obtaining a numerical expression for the pressure of the steam at 12 different measures of the volumes occupied by water and steam, which expression I have succeeded in integrating accurately, and have thus obtained an accurate numerical expression for the destructive energy of the steam. In regard to the use of General Didion's experiments, giving the velocity of the ball in cannon of different sizes produced by different charges of powder, I have found which of these experiments exhibits the greatest energy per kilogramme of powder, and have adopted it in the comparison. The result is as follows:—The destructive energy of one cubic foot of water, at 60 pounds pressure per square inch, is equal to the destructive energy of two English pounds of gunpowder in General Didion's common experiments, which were made, as I understand, with smooth-bored cannon. It cannot be doubted that much energy is lost in the windage, some also from the circumstance that the propelling power ceases at the muzzle of the gun before all the energy is expended, and some from the coolness of the metal. If we suppose that from all causes one-half of the energy was lost, then we have this simple result:—The gage pressure being 60 pounds per square inch, one cubic foot of water is as destructive as one pound of gunpowder. In one of Mr. Biddle's experiments the steam valve was opened rather suddenly, and the steam escaped instantly with a report like that of a heavy piece of ordnance. This is not to be wondered at, for it appears from the comparison that the effect was the same as that of firing a cannon with a charge of 44 pounds of gunpowder."

Gold and Currency.—As this has ever been a most interesting topic with financiers, merchants and others; and as it is now engaging more attention perhaps than ever it received before, owing to the peculiar condition of things in America and Europe, the following extracts from a paper by H. Fawcett, will be of general interest:—"During the reign of Augustus the gold and silver mines of Italy were very productive, and prices in Rome were high. These mines seemed gradually to become exhausted with the decline of the Roman Empire, and prices were constantly falling. During the whole of the Middle Ages the supply of the precious metals was extremely scanty. From the discovery of Potosi in 1545, Europe obtained a constantly-increasing amount of gold and silver from America, and at the end of the 16th century the amount of gold and silver possessed by Europe was at least six times the quantity which she possessed before the discovery of America. Mr. Jacob and all the best authorities who have written on the subject have concluded that this additional supply of the precious metals depreciated their value at least 400 per cent; or, in other words, general prices had increased 400 per cent from the discovery of America in 1492 to 1600. The American mines maintained their productiveness up to the year 1810, and during the whole of this period prices seemed steadily to advance as the accumulation of gold and silver became augmented. Between 1810 and 1830 the gold from these mines became diminished, and a decline in general prices occurred. About 1830 the deficiency in the supply of gold was made up by the increased productiveness of the Russian mines, and nothing happened to affect the value of gold and silver until the year 1848, when the wonderfully rich gold mines of California were first discovered. Three years after this equally rich deposits of gold were discovered in Australia, and so extraordinary was their productiveness that the aggregate annual yield of gold was immediately increased fourfold. The commercial world was startled, and, as the experience of the past had shown that any great increase in the supply of gold had always caused a depreciation in its value, it is not surprising that the best authorities confidently predicted that if the Australian and Californian mines maintained their richness, gold must in the course of 10 or 12 years be depreciated at least 25 or 30 per cent. These predictions have not been fulfilled. The best authorities on the subject still dispute whether a depreciation has as yet taken place. During the last year a very remarkable pamphlet had been published by Mr. Jevons, a gentleman who had been employed at the Sydney Mint, and who possessed great practical knowledge on the subject. Mr. Jevons made a most elaborate comparison of the prices of various commodities, with their prices a few years previous to 1848. He had, as far as it was possible, eliminated every disturbing circumstance, and had proved a depreciation in the value of gold; or, in other words, a rise in general prices amounting to about 10 per cent. If the present yield from Australia and California continued during the next 10 years, and this seemed not improbable, £200,000,000 of gold would have to be absorbed. After making the most ample allowances for the additional gold which would be required in consequence of the increase in wealth and population, he thought that during the next 10 years not more than £60,000,000 of gold could be absorbed by Europe without a depreciation in its value. He thought that Mr. Cobden and M. Chevalier were wrong in supposing that commercial panics would be more frequent if there was a rise in the prices of commodities. It was, however, difficult to exaggerate the many serious consequences which would result from a depreciation in the value of gold, for if this depreciation amounted to 40 per cent, every fixed money income would be virtually diminished 40 per cent. It should be remembered that a depreciation in the value of gold was always liable to be more or less counteracted; because, as the value of gold decreased, the profits of gold mining would also diminish, and this would exert a tendency to lessen the supply. Mr. Jacob considered that not more than one part in 600 of a gold currency was annually lost by waste. The whole gold currency is £300,000,000. He therefore made a liberal estimate in considering that £1,000,000 per annum would be required to maintain the annual loss by waste. He had fully considered the increase in population and wealth when he stated that not more than £6,000,000 per annum of the Australian and Californian gold could be absorbed by Europe without depreciating its value, unless there was an export of specie to the East. Since 1851 there had been an extraordinary export of specie to India and China, and this had been the chief cause which enabled the additional supplies of gold to be absorbed without producing a greater depreciation in its value. In 1851 the amount of specie exported to the East was only £1,500,000, whereas in 1857 this amount had increased to £20,000,000. This extraordinary export of specie was due to the great increase of commerce and to the large expenditure of English capital upon Indian railways and other public works in that country. Between 1847 and 1857 the import of tea from China had doubled. An immense amount of silk had also been imported from China, in consequence of the failure of the silk crop in Europe. Silver, and not gold, had been exported to the East, but still this export provided a source for the absorption of gold, since the silver has been chiefly supplied from the currency of France, and gold has been substituted in its place. The question as to the future depreciation of gold mainly depended upon the continuance of this export of specie to the East. If it should to a great extent be discontinued, then it seemed certain that the value of gold would be rapidly depreciated. At the present time it seemed probable that less specie would be exported to the East. The amount during the present year would be not more than half what it was in 1857."

Growth of the Railway System.—The following remarks on this subject are by Sir William Armstrong :—"The history of railways shows what grand results may have their origin in small beginnings. When coal was first conveyed in the neighborhood of Newcastle from the pit to the shipping-place on the Tyne, the pack-horse, carrying a burden of 3 cwt., was the only mode of transport employed. As soon as roads suitable for wheeled carriages were formed, carts were introduced; and this first step in mechanical appliances to facilitate transport had the effect of increasing the load which the horse was enabled to convey from 3 cwt. to 17 cwt. The next improvement consisted in laying wooden bars or rails for the wheels of the carts to run upon; and this was followed by the substitution of the four-wheeled wagon for the two-wheeled cart. By this further application of mechanical principles the original horse load of 3 cwt. was augmented to 42 cwt. These were important results, and they were not obtained without the shipwreck of the fortune of at least one adventurous man whose ideas were in advance of the times in which he lived. We read, in a record published in the year 1649, that 'one Master Beaumont, a gentleman of great ingenuity and rare parts, adventured into the mines of Northumberland with his £30,000, and brought with him many rare engines not then known in that shire, and wagons with one horse to carry down coal from the pits to the river; but within a few years he consumed all his money and rode home upon his light horse.' The next step in the progress of railways was the attachment of slips of iron to the wooden rails. Then came the iron tramway, consisting of cast-iron bars of an angular section; in this arrangement the upright flange of the bar acted as a guide to keep the wheel on the track. The next advance was an important one, and consisted in transferring the guiding flange from the rail to the wheel; this improvement enabled cast-iron edge rails to be used. Finally, in 1820, after the lapse of about 200 years from the first employment of wooden bars, wrought-iron rails, rolled in long lengths and of suitable section, were made in this neighborhood, and eventually superseded all other forms of railway. Thus, the railway system, like all large inventions, has risen to its present importance by a series of steps; and so gradual has been its progress, that Europe finds itself committed to a gage fortuitously determined by the distance between the wheels of the carts for which wooden rails were originally laid down. Last of all came the locomotive engine, that crowning achievement of mechanical science, which enables us to convey a load of 200 tuns at a cost of fuel scarce exceeding that of the corn and hay which the original pack-horse consumed in conveying its load of 3 cwt. an equal distance. It was chiefly in this locality that the railway system was thus reared from earliest infancy to full maturity, and among the many names associated with its growth that of George Stephenson stands preëminent. In thus glancing at the history of railways we may observe how promptly the inventive faculty of man supplies the device which the circumstances of the moment require. No sooner is a road formed fit for wheeled carriages to pass along than the cart takes the place of the pack-saddle; no sooner is the wooden railway provided than the wagon is substituted for the cart; and no sooner is an iron railway formed, capable of carrying heavy loads, than the locomotive engine is found ready to commence its career."

[Sir Wm. Armstrong is entirely too imaginative in his concluding remarks,

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## THE GREAT WORKS OF THE PERIOD.

Many years ago a work was published in Paris, the exact title of which has escaped our recollection, to the best of our belief it was "Wonders of the year 3,000." In this book were humorous illustrations representing the progress of the world up to that period and the marvellous things mankind would be enabled to perform through the aid of machinery, &c. Among other engravings there was one of a huge mortar from which two bombs chained together were issuing. In each bomb two placid Gauls were seated smoking (as was quite natural), and reading the papers as they journeyed rapidly through the air. Another engraving represented an individual with a locomotive on each foot making seven league strides over the country, and enjoying the scenery with his hands in his pocket. As we have not yet achieved the 30th century, it is hardly wise to predict as impossible the forecasting of the French work, and while the busy inventors of the day have not as yet turned their attention to shooting men through the air in bomb shells, the capitalists and energetic people of the period have taken hold of mighty works calculated to open up commerce and extend the bonds of human brotherhood in a remarkable degree. Railroads, telegraph lines, canals, on stupendous scales, are either projected or going forward with such promptness that there would seem to be no part of the habitable globe to be left untrodden by the feet of men, and no wilderness however savage or forbidding, to be left desolate and uncultivated.

The Suez Canal, intended to connect the Mediterranean Sea to the Red Sea, and which has been so long delayed from various causes, has at length been taken up again by parties styling themselves "the Universal Company of the Suez Maritime Canal." The exclusive privilege of forming this company was granted by the late Pasha of Egypt to a French engineer; the capital stock amounts to $40,000,000, in shares of $100 each; the Pasha investing to the amount of $18,000,000. The works are to be completed in six years, the Egyptiangovernment to have a claim of 15 per cent. on the net profits of each year. The canal itself is to be ninety miles long three hundred and thirty feet wide, and twenty feet below low water level in the Mediteranean Sea.

### AMERICAN CANALS.

"The immense cost of this enterprise, as compared with the Erie Canal for instance, might not be understood if the fact of deepening, or rather making supports at either end of it, were not taken into consideration. The Erie Canal, with its various feeders, is nearly five times the length of the Suez Canal, being four hundred and twenty-four miles and a half, and its entire cost is only a fraction above the estimated cost of the other. The Suez Canal, as we have said, is to cost $40,000,000. The total cost of the Erie Canal is set down at $41,873,738. It may not be out of place here to cast a glance over the other great works of this character in the United States. Next in extent to the Erie Canal comes the Wabash and Erie Canal, from Evansville, Indiana, to the State line of Ohio, three hundred and seventy-nine miles; and next the Ohio and Erie Canal, which connects the Ohio river at Portsmouth with Lake Erie at Cleveland. The length of the latter is three hundred and seven miles. Its dimensions, however, are much less than those of the Erie Canal, the width being only forty feet and the depth four feet. The Chesapeake and Ohio Canal is the next most important work of this character in this country, though of late years it has been permitted to fall into decay. It extends from the Potomac, at Georgetown, to the Cumberland mines, in Maryland, the original design of extending it to the Ohio river not having been carried out. The length of the canal is one hundred and eighty-four miles and a half, and its cost ten and a half millions. The James river and Kanawha Canal, in Virginia, connecting these two rivers, is also a very important work. Its length is one hundred and forty-eight miles, and its cost $6,-139,280. Since the rebellion broke out there have been reports of the sale of this work by the State to a French company; but the exact facts of the case are not easily to be got at just now. The total length of canals in the United States may be set down at about four thousand five hundred miles, which, at the average cost of the Erie Canal—say $100,000 per mile—would represent a total outlay of $450,000,000."

### SHIP CANAL FROM THE MISSISSIPPI TO LAKE MICHIGAN.

The Ship Canal Convention which assembled in Chicago in June last, dispersed without coming to any satisfactory decision. The plans proposed are:—

"1. To make a slack water navigation of the Illinois and Des Plaines rivers, and to enlarge the present Illinois and Michigan Canal to such dimensions as shall admit of the passage of gunboats and of the largest class of Mississippi steamers to the lakes.

"2. To enlarge the locks of the Erie and Oswego canals of New York to such dimensions as shall pass an iron-clad gunboat twenty-five feet wide and two hundred feet long, and drawing not less than six feet and six inches of water.

"The cost of the first project would be about thirteen million five hundred thousand dollars, and the second about three million five hundred thousand dollars. This project came within a few votes of being carried out at the last session of Congress, and a more determined and probably successful effort will be made in its favor at the approaching session."

### THE RAILROAD SYSTEM OF THE UNITED STATES.

"In this connection, a glance at the extent of the railroad system of this country is not inappropriate. There were, on the 1st of January, 1862, in the whole of the United States, thirty-three thousand two hundred and twenty-two miles of railroad in actual operation, and seventeen thousand eight hundred and ninety-two miles in course of construction, making an aggregate of fifty-one thousand one hundred and fourteen miles; the cost of which is set down at the enormous figure of eleven hundred and ninety-two millions four hundred thousand, five hundred and twenty-four dollars: a sum of money which would go near liquidating our national debt. More than two-thirds of the extent of lines actually operated was the result of the previous ten years' enterprise; for on the 1st of January, 1852, our railroad system only represented a length of ten thousand nine hundred miles. The single State of New York has (exclusive of city lines) two thousand seven hundred and ten miles of railroad. The total cost of the construction and equipment of the railroads of this State (inclusive of city roads), is given in last year's annual report of the State Engineer and Surveyor at one hundred and forty-five millions of dollars; and their aggregate earnings for the preceding year at twenty-nine millions five hundred and seven thousand one hundred and eighty dollars."

### TUNNELING THE ALPS.

"One of the most stupendous works ever undertaken in connection with railroad building is the tunneling of the Alps, for the purpose of opening communication between Piedmont and Savoy. The tunnel passes beneath what is known as the Frejus ridge, in the vicinity of Mont Cenis, from which it takes its name. It has an average depth of about a mile below the surface, and is to be about eight miles in length. The hight is nineteen feet and the width twenty-five. As shafts a mile in depth were out of the question, the tunnel has been worked from the extremities alone. Scientific expedients have been resorted to to supply the workmen with air, which is forced into iron reservoirs, and made useful also in working the boring machines. The mode of operation of these borers is thus described:—Six of them, having an edge in the shape of the letter Z, with the machinery for driving them forward, six reservoirs, containing water, which is forced in a constant jet into the hole while the boring is being performed, and a gas apparatus, are mounted on a railroad carriage frame and sent in. The whole works in a heading eleven feet six inches by eleven feet. It drives holes in the rock, varying from two to three feet, in about twenty minutes. These holes can be bored either horizontally, vertically or obliquely. As many as eighty are sometimes driven in the face of the rock, but all are not charged with powder, the object in making most of them being merely to facilitate the breaking up of the rock when the powder explodes in the others. When the holes are bored the machine is drawn back upon the rails to a distance of about fifty yards. Great wooden doors are then shut to guard against injury to the machinery or workmen, and the holes are filled with powder, which is ignited by means of a fuse. There are two blasts every twenty-four hours. It requires a long time to get rid of the foul gases produced by the explosion and to remove the debris—from an hour to four and a half hours—so that but slow progress is made. Not more than five feet of tunneling can be done daily, from each side, at which rate it would take ten years to finish it. But machines are being made which, it is supposed, will expedite the work about one-third, so that six years may suffice to see it completed. Its estimated cost is three millions of dollars. The sides of the Mont Cenis tunnel are lined with the excavated stone, and the roof with brick work. The walls are vertical and the roof semi-circular. The lining is carried about a foot below the roadway, and makes a miter joint with the rock, so as to convert the substratum into a natural invert. A little over a mile, or nearly one-sixth of the tunneling is finished. The tunnel will have a continuous gradient, falling from the Savoy end toward Italy at the rate of one in five hundred. The approaches are rather steep, being about one in fifty on one side and one in forty on the other. The hight of the tunnel above the sea is, at its Italian entrance, 4,331 feet."

### THE HOOSIC TUNNEL.

"The Hoosic Mountain, lying between the Connecticut, and the Hudson rivers, in Massachusetts, can bear no comparison with the Alps or the Pyrenees; and yet the tunnel on the Troy and Greenfield road falls little, if at all, short of either the Mont Cenis, or the international tunnel of the Aldrides. Like those, it cannot be worked by the ordinary method of sinking shafts, on account of the hight of the mountain, but has to be opened from either end. It is four and a half miles in length, and its internal dimensions are fourteen by eighteen feet. The material through which it is cut is mica slate. In 1854 the State of Massachusetts authorized a loan of its credit to the company for the execution of the work of two millions of dollars, the bonds to be delivered monthly, at the rate of fifty dollars for every lineal foot excavated."

### TELEGRAPHS IN ASIA.

The great capitals of Asia are being woven into this network of telegraphs. Madras, Bombay, Calcutta, Singapore, Cochin China, Canton, Pekin, Japan and the Aleutian Isles are to be drawn close to the commercial centers of Europe and America. The Island of Java had sixteen hundred miles of telegraph in operation in 1853, and had fourteen offices open; the business done for the year amounted to twelve thousand eight hundred and seventeen despatches. Thus is civilization being spread through the remotest and most benighted regions of the earth, by an agency in ignorance of which all the buried generations lived and died, and the first practical test of whose power was made within the last twenty years, in the transmission of the message of an American President from Washington to Baltimore, in 1844."

## Malaria.

This atmospheric poison has been proved to be caused by the decomposition of organized matter, and it exists to some extent everywhere. Vegetation both grows and dies, and in the soil its decomposition goes on at various rates. Soils generally are acidulous; but a rich, highly-manured, warm soil is alkaline. Where most alkali exists there is a greater facility for the escape of vapors, such as we suppose to be hurtful. The extreme condition of putrescence may be very readily produced in a soil by artificial means; the use of a little ammonia, for example, more than vegetation will bear. The substances putrefy until the whole becomes fetid in the highest degree. We have then a soil rich in organic matter and undrained:—a swamp of the worst form if the soil be not very poor; worse, perhaps, than was ever seen in nature. It is artificial malaria. We can, then, produce malaria from the soil by fostering some of its tendencies.

Cold weather tends to produce acidity of the soil, hence malaria is always diminished with a lower temperature. When a warm alkaline soil is washed with water and exposed to the air, decomposition is stopped, and it sends forth less malaria. Drainage is the most effectual method of preventing malaria arising from swampy districts.

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### The New Metal Indium.

At a recent meeting of the Chemical Society of Union College, E. P. Magoun, Chairman of the standing committee on metallurgy, reported the following notice of a new metal :—

"Since the invention of the spectroscope in 1860, by a German chemist, Bunsen, several new chemical elements have, with its assistance, been discovered : caesium in 1860, and rubidium in 1861, by Kirchhoff and Bunsen : thallium in 1861, separately by Wm. Crookes of England and M. Lamy of France : and we now can announce a fourth. In the summer of 1863, thallium having been detected in minute quantities in many of the products of the smelting works at Freiberg, Saxony, F. Reich and Th. Richter, examined some of the ores, at the laboratories of the works, hoping to ascertain its source. These ores consisted of pyrites, mispickel, blende, and galena; with earthy matter, silica, manganese, copper, and minute quanties of tin and cadmium. The ores were roasted to expel the greater part of the sulphur and arsenic ; then mixed with hydrochloric acid, evaporated to dryness and distilled. The impure chloride of zinc thus obtained was examined before the spectrescope for thallium. No thallium line was found ; but, instead, an indigo blue line, entirely new, and different from that produced by any known substance. Messrs. Reich and Richter succeeded in preparing this new substance, in the forms of chloride, hydrated-oxide, and of the pure metal. Upon examining this substance before the spectroscope, slightly moistened with hydrochloric acid, the blue line was found, so sharp, distinct, and permanent, that they no longer hesitated in pronouncing it a new element, to which they gave the name of indium. The blue line is much more refrangible than the blue line of strontium, and there seems to be a much fainter line than this, of greater refrangibility, which approaches, yet does not quite reach the potassium line. Only a few chemical properties are at present known, that can be stated with certainty : these are as follows, viz :—

1. The chloride is not precipitated by hydro-sulphuric acid.

2. Ammonia precipitates from the chloride, the hydrated oxide.

3. The dry chloride absorbs water with avidity, and deliquesces.

4. The chloride fused on charcoal with soda, yields a lead-gray globule of metal, very soft and ductile.

5. The metal heated alone on charcoal, gives a yellow coating, which upon being moistened with nitrate of cobalt, gives no characteristic reaction."

### Type-setting Machines.

A lecture was delivered on this subject, on the evening of the 10th inst., at Stacy Hall, Boston, by Charles W. Felt, the inventor of a type-setting machine. It was given before the Boston Printers' Union, by invitation. Alluding to the efforts made by others recently to facilitate the composition of type, he said :—"Thomas N. Rooker, and John H. Tobitt, of New York, and Mr. A. H. Bailey, of the Boston *Transcript*, were mentioned as having devoted more or less time to improving the prevailing methods. Mr. Rooker has introduced into the *Tribune* office forty cases with movable bottoms. In these cases the bottoms may always be kept conveniently full in composition, and in distribution the bottoms may be lowered so as to receive a large quantity of type. Mr. Tobitt's plan, and also that of Mr. Bailey, is that of uniting two or more letters upon one body, so that by one lift two or three letters are set up instead of one. Mr. Bailey's system of combinations is calculated to save from 20 to 40 per cent in composition. When it is considered that the word *the* forms six per cent of the language, and *and* about four, while many others exceed about two per cent, the advantage of a combination system is evident. The difficulty in the matter, as Mr. Felt alleges, is as to how many and what combinations may be used with profit. The use of type setting machines, it was claimed, would add 25 per cent to the earnings of the printer ; but the stronger argument in its favor is that it will add twenty-five per cent to his life. Though the subject of combination type is one of primary importance, because so simple, and because yielding a gain which is a profit of itself, yet the great reform in printing is to be made by introducing machinery. In all machines hitherto invented no attempt has been made to justify. The possibility of justifying by machinery has long been doubted, but Mr. Felt contends confidently that there is no impossibility in the case. The type are set up in his machine in the usual order as the keys are touched, and the words are separated, not by the usual spaces, but by pieces of steel with beads by which they may be drawn out."

## THE INDIAN SUMMER.

The genial season of the year has arrived when the harvests which ripened all summer are gathered in, and the husbandman rests from his toil. When the land produces nothing he recuperates, and the flocks and herds sleep drowsily through the winter gloom. A recent trip through some of the Eastern States disclosed the fact that—to the eyes at least—the farmers in that section have no cause to complain ; if barns almost bursting with their wealth of grain, and abundant hayricks scattered here and there through the fields, may be taken as any evidence of prosperity. All nature smiles, and the mellow October sun never shone more gently upon the land than during this present month. While war still rears its horrid front along the borders, and the sound of armies contending against each other startles the ears of those who dwell in the Middle States, we at the North know little of its actual existence save in tidings which tell of battles lost or won. The balmy air bears no whisper of death or decay, and the promise of the summer is fulfilled in these lovely autumn days. Like a serene old age the dawn comes in, and the shadows grow and lengthen over hill and mountain top, until they fade away in the purple night again. The breath of the woods is sweet and odorous, and the fallen leaves that strew the paths rustle with the quick leap of the squirrel or the whirr of the startled partridge. The maples, spangled all over with crimson blushes, the birches with a pale and yellow melancholy, and the tupelo trees clothed with a fiery radiance like warriors in battle array, guard the aisles of the wood, and in the sunny hollows thereof the blue jay makes his peevish complaint through the livelong day. The hawk whistles his shrill note and the lesser feathered tribes cower in dismay ; eagles sail above the weather-beaten cliffs on the mountain, and from the rugged pine tree top the crows croak dismally their woes. Nature is calm and full of a placid dignity, while man alone, of all the animated world, disturbs her repose by wars, burnings, and slaughter. God grant that this beautiful land may enjoy peace and quietness before another autumn returns.

## THE NEW POSTAL CURRENCY.

If the new fractional paper currency just issued is a fair sample of the ability of the designers and engravers employed by the Government, then we think it would be for the public advantage to have the work contracted for by parties who understand their business. The design, if we may dignify the abortion with such a name, is none at all, and the mechanical execution is still worse. In the ten cent denomination before us, the "Father of his Country" is encircled by a bronze ring, over which is a small key: we know it *is* a key, for we have been told so, though at first we mistook it for a drumstick. On either side of the portrait of Washington, who looks dejected enough, are the time-honored steamboats, railways, boxes, &c., which have formed the headings of all the old fogy newspapers in the country for the last half century ; and enclosed by borders at top and bottom of the note are the words, "Receivable for Stamps, &c.," and "furnished only," &c. Upon the back ground, in faint old English letters, are the words, "United States."

The back of the note is still worse if possible, than the face ; it being a huge green irregularly-shaped shield, buckler, or tea-waiter (we dont know what to call it), with an adolescent eagle bearing a sprawling label in his beak covered with "Responsible for United States Notes," &c., a huge bronze 10 being scrawled over the whole back. We should like to ask what the object was in recalling the old issue and supplanting it with this. Certainly no counterfeiter would risk his reputation by attempting to imitate the new currency, and in this respect it may be desirable to circulate it. The engraving on the note is perfectly abominable, and in a short time will be utterly illegible. The only good thing about the currency is the "little joke" of Secretary Chase upon it. On being asked what was the meaning of the bronze circle about the vignette of Washington, he answered that it was a faint attempt on the part of the administration to give the currency a metallic ring. A rumor has been circulated that the plates for the new currency have been destroyed. We heartily hope that they have and if a new design is introduced, let it be intrusted to parties having a knowledge of the business of bank-note engraving.

## TRAMPING MECHANICS.

During a recent visit to a large manufacturing establishment in Connecticut, the superintendent informed us that the disposition to "tramp" was getting somewhat common, among otherwise good mechanics. They come to a workshop in squads of three or four, hire out for good wages, and as soon as they find out that, in consequence of the scarcity of hands, their services are really valuable to their employers, they begin to grumble about wages, and threaten to tramp unless they are paid more per day. The practice is a bad one, and the sooner mechanics find this out the better.

Employers are now generally willing to pay the highest wages to mechanics, and the latter will usually do much better to hold on to a good place rather than shift from point to point looking for a better job. Any mechanic will do better by sticking to steady employment and fair wages, than to be roving about losing his time and spending his money in search of higher pay. He will do well to remember that "the rolling stone gathers no moss."

### Musical Glasses.

When a clean wet finger is passed round the brim of a goblet, a pleasing vibration is produced, and the sound is purer, more musical, than when the glass is struck. This fact has led to the construction of a cheap musical instrument, upon which those who have an ear for music may easily play simple airs, and thus amuse themselves and their friends. Any air can be played in the compass of an octave ; thus, eight goblets will make a set, or, better still, twelve will extend to an octave and a-half. The best form of goblet is the bell shape, uncut, and having a foot. The goblets must vary in size ; the large ones forming the bass notes, the smaller the treble. If the tones of the glasses are required to be very correct, they must be selected and compared with the notes of musical strings, minute variations being readily corrected by placing more or less water in each goblet. Thus tuned, make a mark to where the water reaches, in order to save the trouble of future tuning. Now fix the glasses about an inch apart in an oblong tray, and they are complete to perform upon. Clean the hands from grease with soap and pumice-stone, so that the fingers may be more sensitive to touch. Wet them frequently, and draw them over the glasses according to the sound or musical note required, and by passing them rapidly from brim to brim harmony is readily produced. Though such instruments are now rarely seen, we may infer from what Goldsmith says in the *Vicar of Wakefield*, that they were in use a century ago. "They talk," says Goldsmith, "of nothing but high life and other fashionable topics, such as pictures, taste, Shakespeare, and the musical glasses."—*S. Piesse.*

TRADE BETWEEN THE LAKES AND EUROPE.—The Detroit *Tribune* says the prospect is now flattering for a large trade between Liverpool and Detroit, Cleveland and other lake cities. It learns from good authority that Messrs. Cunningham & Shaw, of Liverpool, in conjunction with P. Trevent, of the same city, but a former resident of Detroit, have it in contemplation to place twelve or fourteen first-class vessels on this route next season. These gentlemen are entirely conversant with this trade. The barque *Ravenna* netted by her round trip this year five thousand dollars. She has performed the quickest time on record between Detroit and Liverpool and return, which was consummated in three months and five days, unker the command of Captain D. N. Mallett. She now takes on at that port 25,000 staves, and will finish at Cleveland with an assorted cargo for Europe.

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### Contagious Eye Disease of Cattle.

The following is from the *Scottish Farmer*, relating to a peculiar eye disease in cattle, which has lately prevailed largely on the continent of Europe, and to some extent in England. As it is possible that the same disease may find its way across the Atlantic, the information here given respecting the mode of treating it will be found very useful to farmers and others :—

"There are few diseases more to be dreaded amongst human beings than that form of malignant inflammation of the eyes which occasionally prevails to a very serious extent amongst children, and which has from time to time affected soldiers in the field. Its tendencies are to spread and to doom to blindness all who are not properly treated, and even not a few that are very judiciously managed by able surgeons. In various parts of the continent of Europe occasional outbreaks of a similar disease have been witnessed amongst cattle. It has been usually attributed to the dust of roads inflaming the eyes of cattle driven to market. Heat favors the progress of the disease, and if recent investigations by skilled oculists can be relied upon, it would appear that heat operates by drying the discharge which flows abundantly from the orbits, and particles of this dried pus are blown about in the air and infect healthy animals. During the last ten or twelve years the malady has appeared in England, and this season it has committed ravages in various counties, but especially in Lincolnshire. The malady has been most rife on cattle-dealer's farms, and so far as we are informed, only spreading to home-bred stock from newly-bought animals. Cattle in apparent health are observed to shun the light. One eye is more affected than the other, and sometimes only the one is seized. The eyelids are closed, swollen, and tears trickle down the face. On opening the lids the membrane of the eye is found of a deep scarlet tint, and the transparent part of the eye has at first a moist and glassy hue. Within a very few hours a film forms over the globe, and the center of the cornea becomes of a reddish-grey color. The film grows thicker, the pain the animal experiences is intense, and the fever dependent on the acute local irritation runs high. A strange change then follows, for the transparent cornea becomes prominent and conical in the center. The fluids within the globe seem to be forcing their way out, and in some cases ulceration sets in and the eye-ball is irremediably destroyed. In other cases the surface of the globe gets thickened, the animal becomes totally blind with one eye or both, and then recovers in general health, but never regains its vision. The tendency to conical protrusion and degeneration of the transparent cornea has led to this disease being termed staphylorma. The disorder spreads to every animal kept with affected ones, and nothing can be more pitiable than to see a blind herd of bullocks or cows.

"*Treatment*—Fortunately, the disease can be treated with success; but on various farms where we have seen the malady a number of blind cattle could be found. Bleeding and emollients must be strictly prohibited. Purgatives are of great service, and the sick animals must be removed from amongst the healthy ones, and shut up in dark sheds or stables. A seton can be inserted near the affected eye on the side of the face, and various lotions can be used. The best is at first a lead and opium wash, which materially relieves. It can be followed up by chloride of zinc lotion, or a nitrate of silver collyrium. The practice of blowing burning alum in the eye is to be deprecated, as it leads to intolerable suffering. The disease lasts from a week to ten days, but it may be cut short in two or three days if properly treated at first."

### Artificial Propagation of Fish.

France has taken the lead in this novel department of natural science, stimulated chiefly by motives of social economy. As early as the year 1848 the great fish-hatching establishment at Huningue, near the Rhine. was opened under the auspices of the general Government, and it now covers seventy acres, with branches in various parts of Europe, each under skilful superintendents. From thence distant lakes and rivers are stocked at pleasure. After being partially vivified in troughs, the incubation is completed in suitable reservoirs near their intended destination—a mode which practice has demonstrated to be most effective. Such success has been attained that predictions are made of eventually stocking all the rivers and lakes with the best varieties of fish.

Ireland ranks next in order, in giving encouragement to this department of enterprise. It is about ten years since the owners of the salmon fisheries near Galway made their first attempt at hatching artificially, and commenced the construction of salmon ladders at the waterfalls; the result of which, as stated by a late English paper, is a wonderful increase in the supply of this fish, and a corresponding addition to the profits." Another establishment, modeled on the same principles, "has added immensely" to the stock of salmon now to be found on the river Tay, Scotland, and much success has been had in similar efforts to restore the productiveness of the rivers Clyde and Thames. Recently a meeting was held in London to organize a piscicultural establishment similar to that at Huningue, to be sustained in connection with the Acclimatization Society. Representatives were present from Australia. It is anticipated that, if assisted by the coöperation of farmers, proprietors of canals, &c., this movement will render excellent service, by collecting ova and distributing the young fish to stock all the rivers. The United States afford unrivalled facilities for the production of fish in the numerous creeks and rivers which intersect the country. Salmon were once plentiful in the rivers of New Jersey, New York, and New England; now none are found in their old haunts. These rivers might be stocked once more with young salmon, and this delightful fish supplied fresh to all our markets.

### Heat and Water.

In winter the surface of masses of water, such as lakes and rivers, are acted upon by the cool air resting upon them, and are gradually, and in very frosty nights, of course, are rapidly cooled. As the water is cooled on the surface the particles become denser, and the particles go down below, and abstract the heat from the portions below. If this went on, the cooling would be a very rapid process—as rapid as the process of heating, in which the heat is conveyed throughout the fluid; but the moment the water has cooled to 39.20 (about 7° above the freezing point), it is no longer capable of contracting by the cold, but the water at the surface becomes lighter than the water below, and floating, forms a sort of blanket of water, which protects the water below from the cold: water being a very bad conductor of heat.

At the temperature of 39 20 Fah. water expands both by heat and cold. Water requires more heat than the same weight of any other liquid or solid to raise its temperature through a given number of degrees. One cubic mile of water in cooling through one degree warms 3076 cubic miles of air through 4°; hence the effect of water surrounding portions of land--surrounding islands—the effect of the sea upon the climate of islands. The air passing over the surface of the ocean in summer is cooled by the water which absorbs heat without becoming much warmer, and gives out heat without becoming much cooler. "One cubic yard of ice in melting cools 21,000 cubic yards of air from 52° to 32°;" hence we can understand the effect upon climates of dense masses of ice surrounding any sea coast.

Water gives off a larger quantity of heat than any other substance, in order to have its temperature reduced from one point to another. This property is called its specific heat. Water is therefore endowed with peculiar properties whereby it retains its fluid condition for a long period when exposed to cold. If it were not for this provision of nature, our climate would be uninhabitable, owing to the vast masses of ice which would be formed during winter, and the frequent frosts that would visit our fields in cool summer evenings.

### Preserving Carmine of Indigo.

Carmine of indigo (sulphindigotate of soda), is generally found (in commerce) in a state of semi-liquid paste, because in the dry condition it becomes after a time covered with an extremely abundant white efflorescence. This efflorescence is due to the sulphate of soda with which the paste is necessarily impregnated, since the sulphindigotate of soda is insoluble only in a concentrated solution of alkaline salts, and dissolves on the contrary, very readily in pure water. The carmine cannot be freed from the alkaline sulphate of washing. Its pasty condition, more or less watery, presents, however, some serious inconveniences; both as respects its portability, and because this state facilitates the admixture of products of inferior coloring power. If from three to four per cent. of glycerine is added to the carmine of indigo paste, it can be dried and preserved for an indefinite time without becoming covered with saline efflorescence, the glycerine not in the least injuring the brilliancy or purity of the color.

### The Incompressibility of Water.

Water is transparent, inodorous and tasteless, but it is not absolutely colorless: it possesses a bluish-green color, which first comes out when we look through a considerable stratum of it. Water is also very incompressible. This is not exactly a peculiarity of water, for all liquids possess this property to a very great extent. For a long time it was imagined that water could not be compressed at all, no matter what amount of force was applied to it; but it has since been shown that it can be compressed to some extent. The experiment is exceedingly difficult to make; and it is still more difficult to demonstrate this compressibility. In the first place the experimenters inclosed the water in a metallic globe, and succeeded in squeezing it in a little; but then came the question whether in squeezing it in one part it expanded in another? But, even, if it were granted that no expansion took place at the equator through the pressure at the poles, still the water might make its way out through the pores of the vessel. We are indebted to Oersted for the first demonstration of the compressibility of water; and the apparatus which he designed was an application of pressure to the external surfaces of the vessel containing the water, so that there should be no question as to the escape of the fluid or the expansion of the containing vessel. Oersted's apparatus consists of a very strong glass cylinder, which must necessarily be of small diameter to enable it to resist the great pressure. It is closed at both ends by ground iron plates screwed together by rods and nuts. This cylinder is filled with water, and it is fitted at the upper part with a little forcing pump, by means of which water from this reservoir can be forced into the cylinder which contains the vessel in which the compression of the water takes place. It amounts to $\frac{1}{51000000}$th of the volume of the water acted upon for the pressure of an atmosphere—15 pounds on the inch. This property of the almost incompressibility of water is applied in the hydraulic press; which is an instrument by which the pressure exerted on a small piston is communicated to a larger one, every square inch of which is pressed upon by the same pressure as is applied to the smaller one. This is the apparatus which is so much used in packing goods and bulky materials for exportation. Those materials, made up into bales, are submitted to the enormous pressure of these hydraulic presses, and are compressed into a fraction of their original bulk, thus allowing a much larger amount to be stowed away in the hold of a ship.

### Galvanized Iron.

Mr. Robert Hunt, in his Supplement to Ure's *Dictionary of Arts*, &c., thus describes the method of galvanizing iron with a crystalline surface:—"The sheets of iron are immersed in a warm bath of dilute muriatic acid, scoured bright with sand or emery, and then washed. A large wooden tank is then filled with a dilute solution of muriate of tin--two quarts of the muriate being added to 300 gallons of water. A layer of finely-granulated zinc is first laid upon the bottom of the bath; then a cleaned iron plate is laid upon this; then a layer of granulated zinc, then another plate, until the bath is filled. The zinc and the iron constitute a feeble galvanic battery; and the tin in the solution is deposited upon the iron, in a thin skin, after immersion for about two hours. The tinned plates are then lifted, and drawn slowly through a bath of molten zinc, covered with a layer of sal-ammoniac, which becomes pasty. Machinery is used for drawing the plates through the bath. The plates take up a very smooth layer of zinc, which, owing to the presence of tin beneath, assumes its natural crystalline character, giving the plates an appearance resembling that known as the *moire métallique*."

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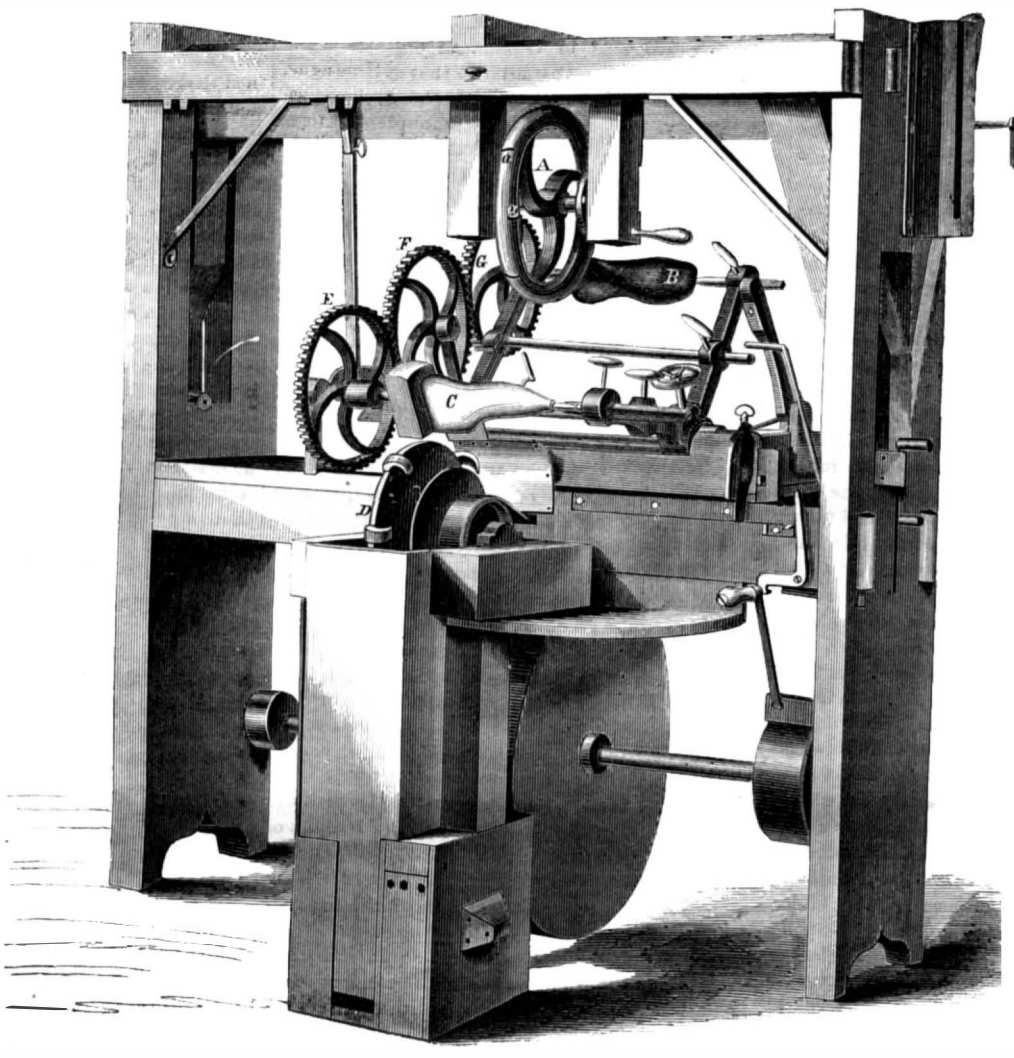
### Improved Last Machine.

The automatic machine, working from positive centers, with a pattern, as devised by Thomas Blanchard, for turning irregular forms, has revolutionized the whole art of manufacturing lasts. As hitherto arranged, however, it has but one size of guide or model wheel, or part of a wheel, which corresponds, of course, in size with the knives on the cutting wheel, and lasts of different sizes cannot thus be turned from the same pattern. The accompanying engraving is a perspective view of an improvement on such machines, consisting in securing a series of guides of different sizes on the periphery of the guide or tracer-wheel, the middle of each guide being set at a proper distance from the center of the arbor on which the tracer or guide-wheel rotates, so that when there are twelve guides, for example, secured on the face of the wheel, twelve different sizes of lasts may be turned by it, by turning the guide-wheel, by hand, to bring each guide successively to press upon the pattern last. A represents the guide or tracer wheel, having a certain number of guides, *a*, of different sizes secured on its periphery. This wheel is immovable, excepting when turned to change a guide, *a*, and bring it into contact with the pattern last, B. This last is secured on a rocking carriage which also has a traverse motion to bring the pattern last from heel to toe against the guide-wheel. On this carriage is also secured the block, C, to be turned into a last of the same shape as B, and the carriage is represented as having moved from right to left, and the block, C, as being nearly turned. A revolving cutter wheel, D, is shown in front of the last that is to be turned. The pattern-last and the block to be turned into a new last, revolve as the carriage slides from one side to the other, and the block, C, is pressed over against the cutter-wheel, and is being turned the proper form. The rotation of the pattern-last and the block, C, is secured through the train of cog-wheels, E F G, which are hung on three arms secured on one standard, and these derive their motion through a pinion on the belt shaft below, gearing into the periphery of the middle wheel, F. As the pattern-last, B, traverses against a guide, *a*, on the guide-wheel, A, the protuberances and hollows of the pattern-last press the rocking carriage nearer to or further from the cutter-wheel, D, so that its operation on the block, C, corresponds with the irregularities of the pattern, but the size of the guide on the guide-wheel regulates the size of the new last. By this useful improvement, of a series of guides of different sizes on the periphery of the guide-wheel of the last machine, as many different sizes of lasts can be turned with the use of one pattern-last and the same set of knives in the cutter-wheel.




TOWN'S IMPROVEMENT IN LAST MACHINES.

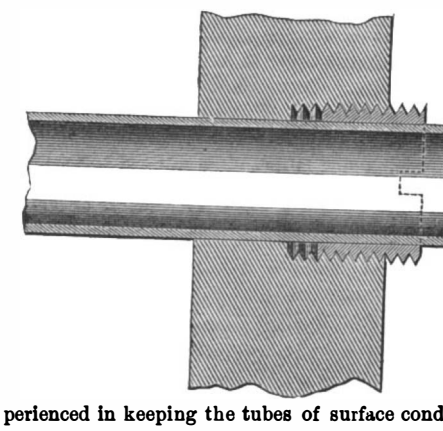
A patent for this invention was procured through the Scientific American Patent Agency, on Sept. 8, 1863. Further information can be obtained by addressing the inventor and patentee, J. W. Town, South Woodbury, Vt.

### Coating Iron Wire with Gold.

Iron wire is coated with gold in England as follows:—"The wire is first cleaned bright and passed around a reel, which is in communication with the zinc terminal of a galvanic battery; then under one or more rollers immersed in a suitable metallic solution, in which also is placed a piece of gold connected with the other pole of the battery, and which is constantly dissolving whilst the coating is formed upon the wire, immersed and passing through the solution; it then passes over a wooden roller or pulley outside the bath, and through a trough containing water, on emerging from which it is wiped dry by a cloth, and finally wound upon a roller to be used as required. The bath or solution before mentioned is prepared in accordance with the metal to be deposited, and it may be silver as well as gold. The iron wire thus coated is prevented from rusting, and is said to be exceedingly beautiful and useful for many purposes."

### PACKING THE ENDS OF CONDENSER TUBES.

It is well known to engineers and the scientific world in general, that much difficulty has been experienced in keeping the tubes of surface condensers tight where they enter the end plates. Ingenious men have expended a great deal of time and money in devising plans for the purpose set forth; many of which are extremely effective, and have done much to build up confidence in the surface condenser. Our engraving represents a method now generally employed in England for the object alluded to. It is extremely simple, and, we are told, effective, and as an improvement in the detail discussed we present this view of it to our readers. The engraving so clearly explains itself that comment is unnecessary. All the material is of brass, and a cotton or india rubber grummet should be slipped over the end of the tube before the gland is screwed on; longitudinal expansion of the tube can then take place at will, without destroying either the mechanical connection or the efficiency of the vacuum.



### New Method of Constructing Ordnance.

Mr. N. A. Patterson, a Union refugee from Kingston, Tenn., called at this office a few days ago and exhibited to us a model of a new method of making ordnance, for which a patent is ordered to issue. Mr. Patterson has been peculiarly unfortunate in being despoiled of his property by the rebels; he is consequently without adequate means to prosecute his patent advantageously, and wishes to form a business connection with some party with a view to carry on the manufacture of ordnance. The advantages claimed by the inventor, and which he seems to have attained in his plan, are greater toughness and homogeneity in the metal as he combines it, and consequently greater endurance in the ordnance. The improvement can be used in strengthening old cast-iron guns, and it is thought by some of the Ordnance officials that it will render them equal to any modern weapon in point of durability. Mr. Patterson has been furthered in his object so far as possible, by General Burnside and other prominent Union officers; and he now wishes to test the invention by putting it in active operation. Communications may be addressed to him at this office.

### Machine-made Horse-shoes.

These articles are now manufactured in large quantities at Providence, R. I., and at Troy, N. Y., the machines, however, being entirely different in construction at the two places. At Providence the shoes are all made from scrap iron, fagoted up, welded together and afterwards rolled into long rods. These rods are creased for the nail hole in passing through the rolls, and are afterward punched complete in one operation—eight holes being made in each one. The shoes are bent into shape by a peculiar apparatus and hammered by a trip-hammer while in the machine, so that they do not spring when taken out or alter in shape. It was a matter of great doubt among mechanics at one time whether horse-shoes could be made by machinery to equal those produced by hand-labor; but, we believe, all apprehension on this score is set at rest, and that machine-made shoes are in all respects as good as those made in the old-fashioned way. The Providence factory is now running night and day, turning out 200 tuns per month for Government use.

THE UNION PACIFIC RAILWAY.—The sum of $2,430,000 has been subscribed to this huge enterprise, and the books closed. The sum required by Congress to be subscribed by any company desirous of taking advantage of the act, is $2,000,000.

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## THE SUPPLY OF PETROLEUM.

The changes which have recently taken place in the use of fluids for artificial light have been rapid and astounding. Only a few years ago whale and lard oils were the common agents for this purpose; then these were superseded in a great measure by that dangerous compound of alcohol and turpentine, called "burning fluid;" and, again, this agent was displaced by oil, called "kerosene," distilled from cannel coal. To produce this oil large distilleries were erected in various sections of Europe and the United States; but now, it too has been superseded by petroleum—the natural product of wells situated in the valley of the Alleghany, Pennsylvania. How this fluid is produced in nature's laboratory is still a subject of speculation, but respecting its nature and uses we are well informed. In most respects it is similar to the oil obtained from coal, but it has been supplied so profusely and at such low prices as to have completely annihilated the manufacture of kerosene. In the course of two short years, the petroleum trade has attained to gigantic proportions. In 1861, only a few hundred thousand gallons of it were exported; in 1862, about five millions of gallons; while during the past seven months of this year, ending with September, twenty-one millions of gallons had been exported. If to this we add the same quantity for the home supply, the yield of the American oil wells is no less than two hundred thousand gallons daily. This is a prodigious quantity, and yet we do not overrate the amount, as we have been informed from very reliable sources. It has become an important article of manufacture owing to the great number of refineries required for its purification, and besides this, it has been the means of creating a new commerce in the numerous railway trains, boats and ships that are engaged in carrying it from the wells to distant places. American petroleum has therefore become an article of great interest, not only to the vast number of persons in most countries who now use it, but to the proprietors of the oil wells, the owners of refineries, and all who are connected with it commercially. In view of the vast quantities which the oil wells have yielded, the question naturally arises—"Will they not soon cease to furnish such supplies, and may not the petroleum trade fall down as rapidly as it has risen up?" Undoubtedly, the petroleum is becoming less in quantity, just in proportion to the amount that is taken away from the wells; but the extent of the supply is as yet unknown. We understand that there are indications of the wells ceasing to furnish supplies for but a limited period, and this has caused some trepidation among those who are deeply interested in the business. Thus the Oil City *Register* says:—"A short six or eighteen months has, with few exceptions, been the average lifetime of the flowing wells. The latter portion of their time of running is also marked by a decrease of at least three-fourths of their original flow." This historic evidence of the past is in some measure useful to form a conclusion as to the future of the oil wells. Individual wells it appears yield supplies for a very limited period; but the sources of petroleum may be like those of coal fields, some of which are so extensive as to have furnished millions of tuns for centuries, by boring new mines to reach different portions of the fields. It is stated that the new wells in the valley of Oil Creek do not give out such quantities as those which were bored about eighteen months ago, but the number of wells is much greater and the aggregate yield of petroleum has not diminished. Nearly six hundred wells have been bored in the one narrow valley, which is not over eighty rods in width and only a few miles in length, and the adjacent ravines bordering upon it have been neglected. As the space hitherto tapped to obtain the petroleum is exceedingly limited, there are no good grounds for concluding that the quantity now furnished may not be continued for many years to come. Similar wells to those which have been bored may be extended over a very extensive area, as petroleum has been found in pumping wells along the Alleghany and Ohio rivers for a distance of more than one hundred miles.

## CONCERNING SAFETY VALVES.

We have seen it stated in a paragraph copied from a foreign paper that "at a recent sitting of the Academy of Sciences of Vienna, M. de Burg described his experiments on the mode of action of the safety valves of steam boilers. These results appear to be quite in contradiction of the theorotical propositions upon which the regulations for the dimensions of these boilers have been based; inasmuch as in reality these valves do not rise to a hight equal to one-fourth of their diameter, that is, one or more inches, but only so as to leave a passage for the steam whose diameter does not exceed the fraction of a line. These apparatuses, therefore, cannot fulfil their object, which is to give a simultaneous issue to all the steam which a boiler can produce when it has reached a determinate degree of tension, and thus to prevent all danger of explosion. To fulfil this purpose they ought to be at least six times, and in some case twenty times larger than the rules prescribe."

Monsieur de Burg has jumped at a conclusion not warranted by the facts in the case. The mechanical action of the valve is as he describes it, but the remedy proposed is ineffectual. If the diameter of the valve be increased six times, the original size being 6 inches with a pressure of 30 pounds on every square inch of area, the pressure (at the same figure) will be nearly 43 times greater, and if we increase the weight at only the same ratio, we shall see that the statement is erroneous at once, and that in practice de Burg's theory would be inoperative. It would undoubtedly be advantageous to increase the size of safety valves in a moderate degree, but there are evils to be avoided in its management which conflict more materially with its usefulness than its small dimensions. These evils relate to a special neglect of its parts and inattention to the functions it should exercise; such as working easily, being sensitive to additional pressure (as it will be if well cared for), and, above all things, free to rise without liability of jamming. We once saw a safety valve bonnet that had a stuffing box on it: the astute designer of this improvement probably meant well and desired to save fuel; but a little thought would have revealed the fact that after the steam had once escaped past the valve, there was not much possibility of utilizing it again. Aside from the absurdity of the application of the stuffing box, it is a positive evil; as the unnecessary tightness and rigidity it involves, prevents the stem from working freely in rising. The friction of the joints about the lever is sometimes objectionable, and has been avoided by dispensing with them altogether, and substituting knife edges of hardened steel. In conclusion it is only necessary to remark that absolute freedom of motion and close attention to the condition of safety valves is indispensable to their proper working and the safety of the community.

## AN ASTRONOMER ON BOILER EXPLOSIONS.

On another page, we have quoted an article from one of our foreign exchanges, purporting to be a condensed abstract of a paper on boiler explosions, by the Astronomer Royal of Great Britain—Professor Airy. A somewhat confused account is given of some experiments made with a boiler, and conclusions are drawn as to the comparative destructive powers of water heated under a pressure of 60 lbs., to the inch, and gunpowder. The conclusions are entirely irrelevant to the question of boiler explosions, for the destructive effect of any expansive agent is in proportion to the suddenness of its action as well as its expansibility, and yet not a particle of information is given by the Astronomer Royal, as to the time occupied by the heated water in giving off its vapor so as to compare it with the instantaneous expansive action of ignited gunpowder. We can take the same materials of which a charge of gunpowder is made, and by simply altering their form into coarse or fine grain, a gun may be shattered to pieces by instantaneous ignition of the charge, or fired without danger owing to the slower ignition of the charge. And the same law holds equally good in the case of heated water generating steam. The evaporation of heated water into steam, when relieved of pressure, goes on very slowly compared with the instantaneous expansion of ignited gunpowder; and its disruptive effect are low in proportion. A pound of anthracite coal under combustion will develope more power than a pound of gunpowder, but it will not produce the same disruptive effects; because its combustion is more slow, and the expansive gases resulting from it do not therefore generate pressure so instantaneously. The statements contained in the extracts from the paper of Professor Airy seem to confute the conclusions. It is stated that the disruptive results witnessed in boilere xplosions are not due to the initial pressure of the steam, but to the quantity of highly heated water in a boiler, generating a great quantity of steam, when relieved from pressure, such as by a rupture. The quantity of water converted into steam, when relieved of pressure, is given in one case, and yet it is admitted, that such steam is of a lower pressure than that which first escapes and lowers the pressure in a boiler by a rupture.

The cause of a rupture in any boiler is due to the pressure being greater than the part that fails can withstand. Now supposing the pressure in a boiler is 60 lbs. on the inch, and that it is instantly lowered to 30 or 15 lbs., by a large quantity of steam suddenly escaping through a rupture, all the steam which is generated afterward from the heated water in the boiler is of the pressure under which it is generated. There can be no doubt about this. It therefore follows that if 60 lbs. pressure of steam only produced a rupture in the boiler, the 30 or 15 lbs. pressure of the steam afterwards generated from the water, cannot produce a greater disruptive effect, for a lesser cannot produce a greater result. The Astronomer Royal, appears to have mistaken quantity of steam for intensity of pressure. Mr. Fletcher, Engineer of the Manchester Association for the prevention of Boiler Explosions, stated some time since, that he intended to undertake some experiments to test this theory of explosions. We trust his intentions will be carried out, and that William Fairbairn, F. R. S., may be associated with him in the undertaking. If the theory of boiler explosions above set forth, is correct, then it is high time the engineering fraternity ceased to construct boilers with safety valves for the purpose of letting off steam and reducing its pressure, because such devices must produce the very results they are intended to obviate.

## DON'T STAND IDLE.

There has never been within our recollection such a demand for workmen of all kinds as exists at the present time. From every factory and workshop, and from some of the most remote points in the country incessantly the cry goes up for "men, men, men." Machinery cannot be put in operation because there are no workmen to build it; even dwelling houses increase in number but slowly for want of stalwart muscle to raise tier on tier of brick or stone. Almost every calling, in fact, every one, is hindered, fettered and seriously delayed from the causes mentioned. Now is the time for every workman to put his shoulder to the wheel; to rouse up all his energies to forward the great works of the day. To the unemployed workman we would say if you have no job go and get one; leave idling and pleasure-seeking until a more fitting season; bear a hand to advance all material operations both public and private as fast as possible. Delay not a moment, but offer your services at the nearest factory; you will certainly be accepted. Good wages are everywhere freely paid for good work, and it certainly seems that an artisan is short-sighted to the last degree who allows the present harvest time to pass without improving every op-

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portunity to lay by a snug sum of money against future want. There are countless neat little cottages and farms about home, or in the far West which can be purchased cheaply, and will make comfortable retreats hereafter for those who wish to be independent of landlords. Now is the chance to obtain such an establishment; for ready money and plenty of work stand waiting for the willing hand to take hold of them. Inventors inform us that they cannot get their machines in operation; "it is impossible to get patterns and castings made" said a capitalist to us the other day; and these are but a few examples of the communications addressed to us. Let every workman see to it that, if idle, he obtains work speedily, and that if he have employment he attends to it with all the energy he possesses.

## AN IMPENETRABLE ARMOR SHIP.

The iron-clad war ship *Dictator*, which is now being built at the large engineering establishment of Chas. Delamater, Esq., foot of Thirteenth street, N. R., this city, from designs by Captain Ericsson, is based upon the principles of the first *Monitor*, but will be different so far as relates to capacity, speed, seaworthiness, and impenetrability to any armor vessel yet built in our country, or that is now being constructed, excepting its consort, the *Puritan*. Some additional facts in relation to this vessel will be of general interest. The extreme length of the *Dictator*, over all, is 314 feet; its aft overhang being 31 feet, and forward overhang 13, leaving 260 feet between perpendiculars; extreme breadth 50, and depth 22½ feet. The hull, in sides and frame, is constructed of iron; the water lines are easy and the model good. The armor shelf extends outside of the hull four feet on each side, and is prodigiously strong. An idea of its impenetrable character will be derived from the following account of its construction. The outside is covered with six one-inch plates of iron fastened in the most substantial manner, and inside of this are three feet of oak timber and an armor lining formed of 4½ inch bars extending all around. The armor shelf therefore consists of 10¼ inches in thickness of iron, and three feet of timber, and between the metal and timber is interspersed a thick layer of felting. No gun yet fabricated can project a shot that will pierce this armor jacket.

The keel plate of the *Dictator* is of one-inch plate, the side plates ⅞th inch, and the frame of double angle-iron, 6 by 4 inches. The interior is divided into several water-tight compartments by plate bulkheads, and the space forward of the third bulk-head below will be used for coal bunkers, through the middle of which will be a railway to carry the fuel to the boilers. The deck beams are of kyanized oak, and all the materials employed in the construction of this great war ship appear to be of the best quality.

Two engines, each having a cylinder of 100 inches in diameter and four feet stroke, will be employed to drive the screw, which is four-bladed, 21½ feet in diameter and of 34 feet pitch. Steam, which is the moving force, will be supplied from six large boilers capable of furnishing 5000 horse power to the engines, and it is reasonably expected that the *Dictator* will have a high speed. As it is to be furnished with a strong iron bow, its speed, strength, and mass will render it a most efficient marine ram. It is to be provided with one revolving turret for carrying two of the most formidable guns with which it can be furnished; and it will be as impenetrable to shot of the most powerful guns as the solid rock of Gibraltar. The inside diameter of the turret will be 24 feet in the clear; a turret directly enclosing this will be formed of six thicknesses of inch plate, riveted together; and over and outside of this will be another turret, forming a sleeve, consisting of seven thicknesses of inch plates riveted together, and between these two circular shields, solid hoops or bars, five inches in thickness, will be packed and fastened securely; the whole forming one great revolving iron tower eighteen inches in thickness, 27 feet in diameter, and weighing about 200 tuns. The design of the *Dictator*, the care bestowed upon its construction, and the excellent workmanship displayed upon every part of the hull and machinery, will render this vessel a credit and a powerful defense to our country. Every effort is being made to advance the work as rapidly as possible, and the launch may be expected in about three weeks or a month from the present date.

## PREVENTION OF DECAY IN WOODEN AND IRON SHIPS.

The prevention of rot in wooden vessels, and rust in iron steamships, are questions of vast importance to all commercial nations. Efforts to prevent wooden vessels from decaying were made hundreds of years ago; but the case is different with iron steamers, as they are only of recent date. Iron now enters so largely into the construction of steamships—mercantile and marine—that intense interest is manifested in the desire to render them as perfect and durable as possible; especially as this metal is liable to rust or oxidize, and the bottoms of iron vessels so readily become foul in salt water. Much has been done to accomplish the objects desired in both timber and iron ships, and yet the defects in both classes of vessels have not been fully remedied. Perfect success, however, is not improbable; but in order to prevent fruitless toil, so as to secure success by new efforts, a knowledge of what has already been done in this department of the arts is necessary. A mass of very valuable and practical information on this head, has fortunately just been presented in the columns of *Mitchell's Steam Shipping Journal*, from a contributor who has consulted all the specifications of patents bearing on the subject in the British Patent Office. These we have condensed with remarks as follows:—

In 1739, Alexander Emerton took out a patent for preserving wood from decay, by boiling planks and boards in oil, then coating them with paints containing poisons. In the early part of the present century, several chemists recommended the treating of green timber intended for shipbuilding with decoctions of vegetable poisons, to destroy all insect deposits in the wood. Applications of this character did not prove efficacious in preventing dry rot, and for a long interval afterwards the question seemed to have vanished from the public mind. John Oxford next secured a patent in 1822 to prevent decay in wood and rust in iron, with a compound of tar oil saturated with chlorine gas, and mixed with red and white lead, the carbonate of lime, and a portion of tar. This compound was applied like paint. In 1830, G. G. Bompass secured a patent for the protection of iron from corrosion by galvanic action. He employed an alloy of tin and zinc in connection with the iron. At the same time John Revere obtained a patent for fixing zinc protectors to the studs of chain cables and other iron surfaces exposed to the action of salt water. These galvanic protectors were riveted or soldered to the iron that was to be protected. When a more oxydizable metal, such as zinc, is placed in contact with iron, a galvanic action ensues, the zinc is decomposed, and the iron, being positive, does not oxydize so rapidly as it otherwise would in the same liquid. In 1832 Captain Crawford, R. N., obtained a patent for preserving iron from oxydation by coating it with zinc paint, over which he laid a covering of an alloy of tin and lead. John R. Neilson took out a patent in 1840 for coating iron with copper, and also with an alloy of tin and zinc. According to this invention, the surface of the iron was first scoured bright, then borax in powder was spread thereon, and it was afterwards drawn through a bath containing the molten metal with which it was to be coated. In 1840 Arthur Wall obtained a patent for applying hot muriate of iron to coat the surface of iron and prevent oxydation. In 1841, W. E. Newton secured a patent for the use of silicates of soda and potash (soluble glass) to the surface of iron, to prevent rust; and at the same time, Professor R. Mallet obtained one for coating galvanized iron with a poisonous paint, to render it suitable for exposure in salt water. In the same year E. Morehead also took out a patent for preserving iron, by first tinning it, then covering its surface by immersion in molten zinc. In 1846, Baron Wetterstedt patented a paint for iron, composed of the regulus of antimony and oxide of copper, mixed with tar, naphtha, and oil. C. H. Paris secured a patent in 1849 for coating metals with glass. The iron was first cleaned, gum water applied to its surface, then powdered glass sprinkled upon it; after which it was placed in a furnace and fused, when the glass adhered to the metal. To protect the bottoms of iron ships, J. Macintosh secured a patent in 1852, for dissolved india-rubber combined with metallic salts. In 1852, Hughes & Firmin took out a patent to be applied to the bottoms of iron vessels, consisting of lampblack, naphtha, and linseed oil: R. M. Glover obtained one in the same year for a paint composed of the arsenite of lead, arsenite of copper, and orpiment; and about the same time T. Murdoch patented white zinc as a paint for iron. In 1853, I. C. Meduros patented the use of mercury as applied to iron, by using a strong solution of corrosive sublimate, in which the iron was immersed until its surface was coated. In 1854 E. Newton patented ground blacklead, pulverized charcoal, and bone black mixed with oil, as a paint for iron; in the same year, F. Ransome patented a mixture of the ground oxides and carbonates of lead and zinc, sulphate of barytes, and soluble silicate of soda applied to iron and wood. In 1856 Bancroft & White patented petroleum as a protective applied to the metal of ships; and in the same year A. F. Mennons patented a composition for iron consisting of clay, animal charcoal, sawdust, and oil; at the same time J. McInnes obtained a patent for coating iron with powdered emery and shellac varnish; R. D. Atkinson patented the coating of iron surfaces with brass in the same year. Armor plates are now being covered with brass at Portsmouth, England, by M. Wielan. A. Reid also secured a patent in 1856 for preventing iron from rusting, by covering the metal with soot, placing it in a suitable furnace, and raising it to a white heat. After being coated, it is asserted that the surface of the iron is covered with a coat impervious to rust. In 1857, G. Bedson patented an elastic paint for iron, composed of mineral tar, india-rubber, tar oil, and shellac; in the same year F. L. Oudry patented the coating of iron with copper upon an intermediate coating of another metal. In 1858, M. M. Bouchaul & Clanel, of Paris, patented a composition for painting iron, consisting of ochre, lime, and oil; and in the same year Le Comte de Fountainemoreu patented an improved mode of zincing iron. In the following year—1859—patents were granted to J. Crawford for a composition consisting of plumbago, arsenic, and lac varnish; also to F. W. Emerson for oxychloride of lead mixed with varnish; also one to J. Meikle for coating iron ships with asphalt. In 1860, patents were issued to M. Allen for gas-house tar applied to the inside of boilers and to ships; to R. Smith, for a mixture of pitch, tar resin, and assafœtida, in turpentine, applied to the bottoms of vessels; and to G. Hallet, for a paint composed of the oxide of antimony and linseed oil. In 1861 John Hay took out a patent for coating the bottoms of iron vessels with black protoxyd of copper ground in linseed oil. This composition has lately been applied to some of the British armor-clad vessels. In the same year John Snider, (an American) patented finely-powdered amorphous graphite, mixed with linseed oil and beeswax, for coating ships' bottoms; and in the same year Hallet & Stenhouse patented native oxides of antimony mixed with red lead, as a paint for iron.

The record of these English patents ends here. They seem to cover almost all substances capable of being mixed with oil and varnish to be applied as paints; also the coating of iron with zinc, copper, and tin. Several of these patented compositions are very similar; and it is not a little remarkable that the zinc protectors of John Revere, patented in 1830, have lately been the subject of a patent in France, by Mons. Jean P. Jouvin, chief medical officer of the French Navy, and Professor of Chemistry at the Naval School, Rochefort. The French Government are now making experiments with them on two armor-clads. To protect the exterior part of the hull under water from the adherence of marine shells, Professor Jouvin also applies a paint composed of turpeth mineral (subsulphate of mercury) Prussian blue, and red lead mixed with boiled oil. This poisonous paint must be applied on the outside of two coats of zinc paint, because the iron would reduce the mercurial paint by direct contact. The most successful method of protecting the bottoms of iron vessels from fouling, appears to consist of a planking of wood extending a little above the water line, countersinking the bolt heads, covering the whole with asphalt and felt as a non-conductor, and then sheathing on the outside with copper.

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## HARBOR DEFENSES.

Since our last remarks upon this important subject we have received some further information with regard to it, which we proceed to lay before our readers.

It seems that, in order to avoid the corporation jobbing and political favoritism usual when large sums are to be disbursed by our municipal authorities, the matter was placed in the hands of a committee supposed to be eminently patriotic, and disposed to obtain the best possible defense with the least expenditure of money. At first the committee appeared disposed to fulfill all that was expected of them; they advertised in the public prints for plans for harbor obstructions to be supplied within a given time, and in order to encourage those who, if they did not expect to be first in the race, yet had a fair chance to be second or third, a premium of three hundred dollars was to be paid to those who were adjudged by competent authority to have presented the first, second, and third best practical systems for harbor obstruction. It being the natural conclusion that those engineers whose plans were adopted would be employed by the committee, at all events, to see that their ideas were properly carried out. So far no fault could be found with the committee.

But month after month passed away and nothing apparently had been done. The newspapers became impatient and urged action of some kind to be taken; the public purse having bled freely, the public itself expected some return. At last a letter from the comptroller appeared, informing us that a good deal had been done in a quiet way, and that we need be under no further uneasiness.

We are glad to hear that such is the case, and shall be happy to learn the names of the successful competitors in order to give them publicity. We know many engineers who prefer reputation to money; but at the same time we have no doubt the committee awarded them due compensation; for we can scarcely credit the statement which has been made to us more than once, that they expected to obtain and use a plan for harbor defense for the ridiculous sum of three hundred dollars!

But in case this should be so—and anything appears possible in these times—we hereby inform engineers who have contrived anything new or patentable, either singly or as a combination, that having submitted the same to the Harbor Defense Committee in nowise invalidates their claims to a patent; so that if no redress can be obtained in any other way, they can at all events in this manner compel a due regard to their just rights.

### The Atlantic Telegraph.

We understand that complete arrangements have been made for the manufacture and laying of another telegraphic cable between England and America. Messrs. Glass, Elliott & Co., of London, are now making the cable, and they also undertake to lay it before the end of 1864. This firm offered to subscribe and pay in cash to the Atlantic Telegraph Company the sum of £25,000 (about $125,000) if selected to manufacture the cable, for which only the price of labor employed and the materials required is to be charged, weekly; the use of the works, machinery and the superintendence by Messrs. Glass, Elliot & Co., not being charged until the cable is completely successful. This offer was accepted; and a scientific committee, consisting of Capt. Galton, Profs. Wheatstone and Thomson; W. Fairbairn, F. R. S., and Joseph Whitworth, Esq., selected to decide upon the best form of cable, chose that which the company has accepted. About 2000 miles in length of cable will be made, and it has been proposed to employ the steamship *Great Eastern* in laying it. The month of July, next year, will probably be chosen for the purpose, on account of its freedom from violent storms compared with other months. About 14,000 miles of submarine cable have already been laid in various seas; but not with much success on the long lines. We hope that the new cable will be laid successfully, and operate satisfactorily. The manufacturers have great confidence in its practicability. Their faith in their own works must be profound to induce them to engage in this transaction on the terms quoted, and the stake they hold in the success of the undertaking is a guarantee that the cable will be manufactured in the best manner known to them.

## RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list:—

*Water Gage.*—This invention consists in a vertical metal tube, having its upper and lower parts connected with the boiler, and having, in one side, arranged one above another, a number of openings covered with a corresponding number of glass cups; which are severally filled with steam or water, according to the level of the water in the boiler, and so give an indication of such level. It also consists in the arrangement within such metal tube, of a float, so combined with a valve in the top of the said tube as to keep the said valve closed while the water in the boiler is at or above a certain level, bnt to open the said valve and permit the escape of steam and so give an alarm when the water is below such level. George Mann, Jr., of Ottawa, Ill., is the inventor of this improvement.

*Toy Watch.*—This invention consists in making the ring or handle of a toy watch, locket, or other similar article, out of one and the same piece of stock with the case, in such a manner that when the case comes from the die, nothing is to be done but to turn the ring over and to burnish the whole in order to produce a finished article; also in a handle or ring of a toy watch, locket, or other similar article produced by folding over one and the same piece of sheet-metal, so that a handle of a thick and heavy appearance can be made out of a small quantity of stock; finally, in the arrangement of scollops on the edge of the case, for the purpose of facilitating the operation of turning said edge over the glass and to improve the appearance of the article when finished. Lysander Flagg and G. D. Briggs, of Pawtucket, R. I., are the inventors of this improvement.

*Paper-making Machinery.*—The objects of this invention are to economise room, to save labor, and to prevent waste of stock in the manufacture of paper and of such boards as are produced from fibrous materials. The invention consists, principally, in the combination and arrangement of two or more cylinder molds so as to deliver their webs of pulp one upon another, for the purpose of being pressed together to form a board of a required thickness, and in the arrangement of drying and calendering apparatus, for drying and calendering such board while in a continuous length and before it is cut into sheets, so that the board is made and finished ready for the market by one continuous operation. The same arrangement of machinery may, by very slight additions, be adapted for the manufacture of several distinct and separate webs of paper at the same time. It also consists in a certain novel system of troughs or spouts, connecting pipes and valves, whereby a properly regulated supply of pulp and water to each of the several machines, and the carrying away of the back-water therefrom, are provided for. It also consists in the employment, in combination with two or more paper machines combined as described, or with a single machine, of an improved "save-all," composed of a vat for the collection of the back-water from the machine, a reticulated cylinder, like that of a cylinder paper-making machine, working in the said vat for the extraction of the pulp from the water, a coucher for receiving the pulp from the said cylinder, and a scraper for removing the pulp from the coucher, and depositing it in a suitable receptacle. And it further consists in certain arrangements of the press rolls and of the drying cylinders and calendering rolls for drying and calendering either boards or paper. John F. Jones, of Rochester, N. Y., is the inventor of this improvement.

*Water Wheel.*—This invention relates to certain improvements in water-wheels of that class which are attached to a vertical shaft and are inclosed by a scroll. The invention consists in a novel manner of applying a ball-governor to the wheel, and in an improved means for rendering the friction on the step or bearing of the wheel shaft, whereby several important advantages are obtained. This wheel is now in operation and works admirably well. It is the invention of T. D. Lakin, of Hancock, N. H.

PATTERNS have been made and measures taken for casting a 20-inch inch gun at Pittsburgh, Pa.

## ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING OCTOBER 13, 1863.

*Reported Officially for the Scientific American.*

***** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.**

40,222.—Lamp.—James Adair, Pittsburgh, Pa.:

I claim, first, The manner of supplying a flame with oil at one side side of a lamp, by carrying the oil up through the top of a lamp and down over its side through a pipe, or its equivalent, which is supplied with a wick, substantially as set forth.

Second, The flaring skeleton frame or support for the cone, forme by splitting the upper end of the wick tube holder, substantially a described.

Third, Covering the cone, D, and the skeleton frame, b, with beads, substantially as described.

Fourth, While not claiming broadly a corrugated cone, I do claim waving or corrugating spirally or obliquely the upper part of a lamp cone, substantially as and for the purposes set forth.

Fifth, Making the upper portion or the whole of a wick tube of metal wound in a spiral form, substantially as and for the purpose set forth.

Sixth, The removable bracket or feed tube, A J, in combination with a lamp top, a', substantially as described.

Seventh, The combination of the removable wick, S, with the re movable tubular bracket, A, and feed wick, J, substantially as de scribed.

Eighth, The sliding and vibrating spur, g, operating in the manner substantially as described.

Ninth, While not claiming the construction of the spring catch, l, described, I do claim arranging it so as to be operated from the spindle or stem of a wick adjuster, substantially as described.

40,223.—Pocketbook.—A. L. Adams.—Philadelphia, Pa.:

I claim the improved movable leaf in combination with the outside fastening, the gusset or band to be made of elastic cloth or other material, as and for the purpose shown and described.

40,224.—Tool for graining in Imitation of Wood.—R. A. Adams. Chicago, Ill.:

I claim the extension and adjustable frame, A A, in combination with the elastic plate, in the manner and for the purposes herein described.

40,225.—Apparatus for planing the Chambers of Cannon. Abraham Alexander, Pittsburgh, Pa.:

I claim, first, The use of a tool consisting of a pulley or cutter holder, capable of at least a partial revolution on its axis, in the plane of the axis of the casting to be acted upon, operating as a feed motion to advance the point of the cutting tool gradually forward in a curved line toward the axis of the casting, the tool being either turned within the casting or the casting revolved around the tool, substantially in the manner and for the purpose hereinbefore described.

Second, Also the combination of a revolving or partially revolving pulley, or cutter holder, carrying a tool or cutter and attached to a shaft or other support, with suitable gearing and chains or connecting rods for giving to the cutter or tool a feed motion in the arc of a circle in the plane of the axis of the gun or hollow casting to be operated upon, for the purpose of causing the tool or cutter to traverse a spherical or spheroconical surface by the revolution of the tool inside of the hollow casting, or of the casting around the tool, substantially as described.

Third, Also the use of a revolving or partially revolving pulley or cutter holder, carrying a cutter, the center of motion of which is eccentric to that of the cutter holder, so as to cause the point of the tool to traverse a sphero-conical surface on the revolution of the casting around the tool, or of the tool inside of the casting, substantially as described.

40,226.—Lamp.—L. J. Atwood, Waterbury, Conn.:

I claim the supporter and slide grasping the wick tube and sustaining the draft plate in combination with a glass chimney having a contracted neck, so that the adjustment of the draft plate can be effected in the manner represented and for the purpose set forth.

40,227.—Lamp.—L. J. Atwood, Waterbury, Conn.:

I claim the combination of the several parts into a convenient, cheap and portable hand lamp, constructed as represented and for the purposes specified.

40,228.—Lamp Chimney.—L. J. Atwood, Waterbury, Conn. Ante-dated Oct. 11, 1863:

I claim the chimney, g, with a circular base, 1, and contracted to the oval neck, 2, below the bulb, 3, for burning coal oil and similar oils supplied to a flat wick, and without any separate deflector, as set forth.

40,229.—Composition for Lubricating Machinery.—Samuel Balsdon, Brooklyn, N. Y.:

I claim the application of the different ingredients aforesaid and prepared as aforementioned, and in the proportion aforementioned, for the purpose of making a composition paste that is anti-friction, for axles and machinery, all substantially as set forth.

40,230.—Oil Vessel.—G. W. Banker, St. Louis, Mo.:

I claim the compound sliding or extension nozzle, a b, constructed and operating substantially as set forth for the purpose specified.

Also, In combination with the above, I claim the cover or shield, c, operating as set forth for the purpose specified.

40,231.—Apparatus for holding Emery or Sand-paper.—E. R. Barnes, Brookfield, Conn.:

I claim, first, The jaws or clasp and springs.

Second, The plates and ears for holding the jaws or clasps.

Third, The cushion over which the paper is placed.

Fourth, I claim holding the cushion in place by placing its edges between the two sections of the base and by means of screws or any other well known mode of fastening, substantially and for the purpose set forth.

40,232.—Sugar Evaporator.—T. C. Bartle, Independence, Iowa:

I claim, first, Constructing the pans as herein described and arranging them at different elevations, in the order named, for the purpose specified.

Second, I claim the dampers, H and G, when arranged and operating as and for the purpose set forth.

Third, I claim the herein described arrangement of flues, within the body of the furnace and beneath the several pans, for the purpose specified.

Fourth, I claim the adjustable steam generator, F, when arranged and operated as and for the purpose described.

Fifth, I claim the skimmer, constructed as herein specified.

40,233.—Corn Planter.—H. F. Batcheller, Sterling, Ill.:

I claim, first, The strip, F, attached to the plunger and connected with the roller, B, by the straps, G G', substantially as and for the purpose set forth.

Second, The rod, J, attached to the plunger, D, when used in combination with the roller, B, as and for the purpose specified.

[This invention relates to a new and improved device for planting corn by hand, such as are commonly termed hand planters. The in

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vention consists in the employment of a seed-distributing roller in connection with a hopper, plunger, seed agitator, and straps, all arranged in such a manner that the corn may be planted very expeditiously and in a perfect manner.]

40,234.—Wick Movers.—Ephraim Beeman, Owego, N. Y.:

I claim the application of the spring, B, and wheels or rollers, C C, to the wick tube, A, acting in such a manner as to take off the friction of the wick upon the inside of the wick tube and operate wicks of various thicknesses with equal ease and certainty.

40,235.—Process for treating Fruit Trees.—Isaac Bolmer, Franklin, Ohio:

I claim the process or treatment of fruit trees, including the mode of planting, mounding and trimming, substantially as herein described.

In combination with the mounds, A A, &c., and the process substantially as herein described, I claim the use of the boxes, B B, &c., arranged as and for the purpose set forth.

40,236.—Method of Drying Flax and Hemp.—George W. Billings, New York City. Ante-dated Sept. 28, 1863:

I claim the drying of flax and hemp in the bundle, in an inclosed chamber, by means of hot air under pressure, and in such manner that the vapor may be permitted to escape at proper intervals during the drying process, substantially as described and set forth.

40,237.—Cider Mill.—Jesse Bowen, Yellow Bud, Ohio:

I claim the arrangement of the eccentric, K, lever, L, rod, N, arm, O, and projections, c, substantially as and for the purpose specified.

I claim in the construction of the rasping cylinder, C, inserting the screws or rasping pins, e, in the channels or grooves, d', allowing their heads to project but a short distance beyond the face of the cylinder, at the same time affording a sufficient space under the heads for the free escape of puip, as herein specified.

40,238.—Smut Mill.—S. D. Broad, Bedford, Pa.:

I claim the employment of the serpentine and radially corrugated plates, j, in combination with the vertically ribbed and slotted cylinder, C, pipes, H, fan, E, and spout, J, operating together as herein shown and described for the purpose set forth.

[This invention consists in a peculiar construction of a scouring device, whereby the grain is thoroughly cleansed from smut by a scouring rather than a beating process, and the grain thereby prevented from being cut and broken, a contingency which occurs in the use of the ordinary scourers, which are provided with beaters. The scouring cylinder is also so constructed as to admit of the free escape of pulverized smut and dust during the scouring operation. The invention also consists in arranging a fan and blast spout in the scouring device, in such a manner that the fine light impurities, such as chaff, &c., will be separated from the screenings, and the latter also separated from the sound grain, all being performed at one and the same operation.]

40,239.—Pump.—James and Daniel Budd, Albany, N. Y.:

We claim, first, The combination with an ordinary pump barrel and piston, of ports or channels, and a valve chamber under the arrangement and for operation, substantially as hereinbefore shown and described.

Second, The arrangement hereinbefore described, in relation to the pump barrel, of ports or channels and a valve chamber, so that the same may be cast in one piece, substantially as herein set forth.

40,240.—Lamp.—C. W. Cahoon, Portland, Maine:

I claim the combination of a sheet metal chimney holder with a stay for the shank thereof, substantially as herein set forth.

I also claim the combination of a sliding bolt with the vibratable chimney holder of a lamp, substantially as herein set forth.

40,241.—Lamp.—C. W. Cahoon, Portland, Maine:

I claim the combination of the clamp support of the chimney holder with the burner by means of a tooth and recess to prevent the support from turning upon the burner, substantially as set forth.

I also claim a perforated corrugated air chamber for a lamp, constructed substantially as set forth.

I also claim the combination of the chimney holder with two tongues to bear against the opposite sides of the burner, or some part secured thereto, and prevent the bending of the chimney holder laterally by the unscrewing or screwing in of the burner, substantially as set forth.

I also claim the combination of the burner which is connected with the collar of the lamp by a screw thread with a stop, which limits the distance to which the burner can be screwed into the collar of the lamp, substantially as set forth.

40,242.—Grain Sieve.—John Capell, Dansville, N. Y:.

I claim a grain sieve or perforated separator, having a waved surface, substantially as and for the purposes herein described.

40,243.—Corn Harvester.—Otis N. Chase, Boston, Mass.:

First, I claim the frame, B, of the harvester provided with the driver's platform, B, in the front, and the attendant's platform, B', in the rear, and with the gathering rollers, f f, and the conduit, l, to conduct the harvested material into receptacles near said platform, B', substantially as described and for the purposes set forth.

Second, I claim the spring guide beam, D, or its equivalent, in combination with the inclined rollers, f f, substantially as described.

Third, I claim the combination of the spring, s, or its equivalent, with rollers, f f, and beam, D, substantially as described.

Fourth, I claim the cutter, y, attached to the frame, B, in combination with the rollers, f f, substantially as described, for the purposes specified.

40,244.—Apparatus for sizing and finishing Skirt Wire.—Saml. M. Chesney, New York City, and J. C. Brown, Brooklyn, N. Y.:

We claim, first, The combination of the heated cylinders, E and F, with the heated polisher, I, when the same are constructed and arranged to polish and finish both sides of the skirt or other wire, in the manner substantially as herein specified.

Second, The combination of the adjustable rolls, a1 a2 and a3, with a sizing bath, in the manner and for the purpose specified.

Third, The adjustable polisher or finisher, when the same is arranged to finish both sides of the covered wire at one operation, substantially as herein specified.

Fourth, The grooved rolls, a2 and a3, when combined in the manner described for the purpose specified.

Fifth, The arrangement described for taking the wire from the reel, sizing, finishing and re-reeling at one and the same operation.

40,245.—Sausage Stuffer.—Absolem Craine, of Altoona, Pa.:

I claim the employment of the two delivery tubes, D D, in combination with a piston, B, operated by means of a screw, C, in a sausage stuffer, so that delivery will be effected during both the forward and backward motions of the piston, substantially as described and set forth, for the purpose specified, and this I claim whether the adjustable sheath, E, be used or not.

40,246.—Washing Machine.—Edgar Chipman, New York City:

I claim the semi-cylindrical rocking suds-box, A, in combination with the arms, g g, and adjustable weights or counterpoises, C C, arranged to operate in the manner substantially as and for the purpose herein set forth.

I further claim the fluted roller, D, hung or placed within the suds-box, A, so as to rotate freely therein, when said roller is used in connection with the counterpoised suds-box, A, as set forth.

[This invention consists in constructing the suds-box of semi-cylindrical form with rockers attached to it or suspended on pivots, and also provided with arms on which adjustable weights or counterpoises are placed, the above parts being also used in connection with a fluted roller placed within the suds-box, and all arranged in such a manner that the machine may be operated with the greatest facility, but little manual labor being required, and the clothes operated upon in the most efficient manner.]

40,247.—Gage for Railroad Tracks.—William Crooks, St. Paul, Minn.:

I claim the combination of the bar, F, the arc, a, and hinge, d, in the manner and for the purpose set forth.

40,248.—Head-block for Saw-mills.—M. W. Dancks, of Fulton, N. Y.:

I claim, first, The combination and arrangement of the chain, C, with the chain wheel, e, and the movable boxes, K, when the whole is arranged, constructed, and operated in the manner substantially as and for the purpose set forth.

Second, I claim also the combination and arrangement of the female coupling, P, sleeve, q, ears, S, hand wheel, r, groove, t, and knuckle joint or their equivalent, constructed and arranged relatively with each other, to operate as and for the purpose described.

40,249.—Shaping Wood for Ox Bows.—H. S. Denison, Coleraine, Mass.:

I claim the roller or its equivalent and the broad plate standard or standards, as combined with or used in connection with the patterns, carriage and the cutter wheel, and constructed and made to operate therewith, substantially as described, in order that a crooked piece of wood, or ox-bow blank, may have imparted to it, while being reduced, the forward and lateral movements necessary to its proper reduction, as hereinbefore specified.

40,250.—Barrel Hoops.—John B. Dougherty, Rochester, N. Y.:

I claim, first, the mode herein described, of forming the lock of a barrel hoop, said lock consisting of two notches cut across the entire width of the hoop, in the manner described.

Second, I claim cutting the hoop splints from a block or board having the position of the locks marked across its face, in the manner described.

Third, I claim leaving the outer end of the hoop the full thickness of the material used, and riveting or nailing it to the other end of the hoop, in the manner and for the purpose set forth.

40,251.—Self-acting Bottle-stopper.—D. A. Draper, East Cambridge, Mass.:

I claim, as an improvement in bottle-stoppers, attaching the ball or valve, A, to its stem, B, by means of fusible metal, in the manner substantially as set forth.

40,252.—Machine for Peeling Willow.—Mathew Esterbrook, Jr., and E. A. Bronson, Geneva, N. Y.:

I claim, first, The combination of a scraper, S, in willow-peeling machines, with feed and discharge rollers, R and R', substantially in the manner specified, when said rollers have a yielding or elastic periphery as set forth.

Second, The construction, arrangement and operation of the scraper, S, substantially as shown in figures 1 and 3, and for the purposes set forth.

Third, The construction of the feed and discharge rollers, R and R', of willow-peeling machines, with a vacant space under the rubber ring, r, substantially in the manner and for the purpose described.

Fourth, The feeder guide, G, constructed, arranged and operating substantially in the manner and for the purpose set forth.

Fifth, The relative arrangement of the feed and discharge rollers, R R', with the scraper, S, the latter being below a direct line between the bite of the front and that of the rear rollers, substantially as shown and for the purpose specified.

Sixth, Driving the discharge rollers, R', faster than the feed rollers, R, so as to insure the drawing of the willow up through the V-shaped notch of the scraper, as and for the purpose specified.

40,253.—Fence.—Abram Fanckbower, Schoolcraft, Mich.:

I claim the rails, A, battens, B C and D, in combination with the arms, E, and stakes, F F', and G G', the several parts being constructed and arranged as and for the purpose specified.

40,254.—Buttons.—A. A. Feldtrappe and Reni Dutfoy, Paris, France:

I claim a button of porcelain or other material, without either a projecting shank or any hole in its face, but having a hole or tunnel extending transversely through the back part of its body, substantially as herein specified.

[This invention consists in a button without either a projecting shank or any hole through its face, but having its attachment to a garment provided for by means of a hole or tunnel passing transversely through the body.]

40,255.—Constructing Toy Watches, Lockets, &c.—Lysander Flagg and G. D. Briggs, Pawtucket, R. I.:

I claim as a new article of manufacture a toy watch or locket, the case, A, of which is made out of one piece, with the handle, B, in the manner herein shown and described.

Second, A handle, B, produced by folding one section, a, over the other section, b, as and for the purpose set forth.

40,256.—Sighting Small Arms.—A. T. Garretson, Mount Pleasant, Iowa:

I claim the combination and arrangement of the adjustable mirror, M, with the front and back sights, a' b', substantially as described, and for the purposes set forth.

40,257.—Grain Drill.—Silas Grenell, Mokena, Ill.:

I claim the combination and arrangement of the slide, M, hole, e, in the bottom of the seed-box or hopper, L, lever, N, attached to slide, the shaft, H, with projection, b, attached, spring, O, and the vibrating board or chute, E, all applied to the mounted frame, A, as and for the purpose herein set forth.

[This invention relates to a new and improved machine for sowing seed broadcast, and it consists in a novel seed-distributing device, in connection with a scattering board, arranged and applied to a mounted frame, in such a manner that the seed will be sown in an even and uniform manner, and in greater or less quantities on a given area of ground, as may be desired.]

40,258.—Potato Separator.—Stephen Harrison, St. Michael's, Md.:

I claim the revolving screen, i, inclined in one direction, in combination with the vibrating screen, j, inclined in an opposite direction, constructed and operating substantially as and for the purposes set forth.

40,259.—Manufacture of Friction Matches.—J. W. Hjerpe, Stockholm, Sweden:

I claim, first, The application of certain ingredients, substantially such as herein specified, for the purpose to obviate the employment of phosphorus or other dangerous substances in the preparation of friction matches.

Second, The method of preparing friction matches as to require a special prepared rubber, substantially herein described.

40,260.—Adhesive Tag for Filing Papers.—Lewis Heyl, Columbus, Ohio:

I claim as a new article of manufacture paper files consisting of strips of tape or other suitable material, having one or both surfaces coated with gum or other adhesive substance, and having loops or rings, woven or otherwise, introduced with the edge or fold, as and for the purpose specified.

[In using this invention the strips of tape are attached to the back edge of each leaf or sheet of paper to be filed, by simply moistening or heating them. A cord, wire or other suitable tie inserted through the loops serves to fasten the sheets together, in such a manner that they may be laid open their entire extent, the opening of each sheet and leaf being quite independent of those to which it is attached.]

40,261.—Granaries.—Theodore Heevmans, Mitchelville, Tenn.:

I claim, first, The horizontal troughs, with or without holes, constructed and used substantially as set forth.

Second, In combination with the horizontal troughs, I claim the vertical troughs, as described.

Third, I claim inclining the holes or openings in the troughs upwards and inwards, as and for the purposes recited.

40,262.—Apparatus for Cooling Malt Liquors.—Otto Hoepfner and Charles Schnepf, Philadelphia, Pa.:

I claim the arrangement and combination of an enclosed fan, with a covered cooler, arranged and combined as herein described, and for the purposes set forth.

40,263.—Preparation of Dye Colors.—Manley Howe and H. R. Stevens, Boston, Mass.:

We claim, first, as a new article of manufacture, dye colors in powder, having incorporated with them the mordants in kind and quantity requisite, substantially as hereinbefore set forth.

Second, We also claim combining with dye colors in powder mordants reduced to powder, substantially as set forth.

Third, We further claim mixing dye colors and mordants, when either or both of them are in a liquid condition, and then drying and afterwards reducing the same to powder, substantially as set forth.

Fourth and lastly, We claim the combination with dye colors and mordants, when mixed in a liquid or pasty state, of starch or other similar absorbent, substantially as hereinbefore set forth.

40,264.—Wooden Sieves for Gas Purifiers.—R. G. Hunt New York City:

I claim, in a slotted wood sieve suitable for gas purifiers, the combination of two or more sets or series of slots and bars secured and combined together by solid wood connections in the middle part of the sieve, substantially as described.

Also, The beveled shape of the solid wood connection, a, between the bars substantially as described.

40,265.—Machine for making Paper and Paper-boards.—J. F. Jones, Rochester, N. Y.:

I claim, first, The arrangement and combination of two or more cylinder molds, vats, felts and press rolls, substantially as herein described, whereby, in the same machine, any desired number of continuous webs of pulp of indefinite length may be either deposited one upon another tor the continuous manufacture of boards, or may be kept separate from each other for the manufacture of several continuous distinct sheets of paper.

Second, The combination with such a system of cylinder molds, vats, felts and press rolls, of a series of guide rolls, n n, for separating the several webs of pulp as they are delivered from the press rolls, substantially as herein specified in the manufacture of paper.

Third, The combination of such a system of cylinder molds as herein above specified, and a continuous series of drying cylinders and calendering rolls, in such manner that the manufacture of boards or of several webs of paper may be carried on by a continuous process, substantially as herein described.

Fourth, The arrangement of the several spouts, G E J, pipes, c m and j, valve, 12, and self-acting feed-gate, d, in combination with each other and with the several vats, substantially as and for the purpose herein specified.

Fifth, The save-all, composed of a vat, a cylinder mold, a coucher and a scraper, combined and applied in connection with one or more paper-making machines, substantially as herein specified.

Sixth, The combination of press rolls, illustrated by M7 M7 M7, in figure 1, to obtain two pressures from three rolls as herein described.

Seventh, The employment of calender rolls on the top of drying cylinders, substantially as herein described, to equalize the water in the board and make it of uniform dryness as it passes over the dryers, and partially effect the glazing and calendering process while the board is being dried.

40,266.—Gas Meters.—H. H. and J. F. G. Kromschroeder, Princess Terrace, Regents Park, Kingdom of Hanover. Patented in England, Oct. 22, 1862:

We claim the combination, in a gas meter, of an annular measuring drum, with an internal float to buoy up the drum in the liquid with which the meter is filled, substantially as described.

We also claim the combination of an annular measuring drum and float, constituting a floating measuring drum, with a lever frame connecting the axis of the drum with fixed necks or axes which are in line with the axis of one of the wheels of the counting apparatus, so that the floating measuring drum acts uniformly upon the counting apparatus notwithstanding its rise or fall, substantially as described.

We also claim the combination of an annular measuring drum and float, constituting a floating measuring drum, with the lever frame and with an adjustable inverted vessel and pipe connected with the supply chamber, so that the position of the measuring drum is controlled by the pressure of the gas in the supply chamber, substantially as described.

We also claim the annular measuring chambers of the annular measuring drum, constructed substantially as described.

40,267.—Horse Powers.—G. Kuenne, J. A. Cole and D. F. Rath, Fond du Lac, Wis.:

We claim the combination of the master or driving wheel, B, screw, E, and pinion, c, on shaft, D, wheels, F F, provided with two sets of teeth, d e, and the pinions, G G, on the shaft, H, and with or without the wheel, I, and pinion, g, for communicating motion to shaft, J, all arranged substantially as and for the purpose herein set forth.

[This invention consists in containing the screw, lever and wheel, in such a manner as to form a simple, durable, economical horse-power.]

40,268.—Water-wheel.—T. D. Lakin, Hancock, N. H.:

I claim the construction and arrangement of the plates, o, and the inner ends of the buckets, i, in the manner herein shown and described, so that the said plates, when open, will form inward continuations of the buckets, all as set forth.

40,269.—Molding Machine.—H. A. Lee, Worcester, Mass.:

I claim, first, Securing the adjustable journal box, a, of the feed-roller shaft, F, to the stirrup, f, and spring, g, for the purpose of making said feed-roller yielding to the unequal thickness of the lumber, substantially in the manner herein described.

I also claim, in combination with the adjustable rests, C, the spirally-grooved feed-roller, D, for the purpose of pressing the lumber against said rests while it is fed forward, substantially as herein set forth.

I also claim, in combination with the vertical cutter heads, R, the boxes, m o, hanger, n, shafts, p 6 and 7, adjusting and set screws, 8 9, for the purpose of adjusting said cutter heads horizontally and vertically, without arresting the motion of the machine, substantially as herein set forth.

I also claim, in combination with the yielding cross-bar, S, pressshoe, w, and its rollers, 14, substantially in the manner and for the purposes set forth.

I also claim securing the press-bars, S and x, in front and to the rear of the horizontal cutting cylinder, T, to the adjustable frame, S, of said cutting cylinder, so as to enable the operator to adjust them simultaneously, substantially as herein described.

I also claim the concave, g', in the bed-plate, B, and under the cutter cylinder, T, to prevent the cutters from striking the bed-plate while operating on the edges of the lumber.

I also claim the adjustable hanger, U, secured to the press-bar, x, and when constructed and operated substantially in the manner and for the purpose set forth.

I also claim the arrangement of the pulleys, z and z', with the belts for driving the shaft, q, of the cutter heads, R R, by means of which I am enabled to throw off either of the two belts without interrupting the motion of the machine, and whereby said pulleys and belts are so arranged as not to interfere with the operator or the free passage of the material from the machine.

I also claim, in combinaton with the press-bar, s, the india-rubber springs, a', and boxes, 11 and t, and screw, 12, for the purpose of making said bar yielding, and for adjusting its position to and pressure upon the lumber, substantially in the manner and for the purpose set forth.

40,270.—Grain Drill.—Gideon Lehigh, Clinton Station, N. J.:

I claim the cranks, g, rod, h, and elbow lever, i, connecting the axle, C, of the rollers, B, with the seed slide, D, and constructed and operating in combination with the stirrers, K, in the manner and for purposes shown and described.

[The object of this invention is a simple, compact and cheap implement for distributing timothy, clover and other seeds, and rolling them into the ground at one operation.]

40,271.—Tobacc Fork.—S. D. Lilley, Ripley, Ohio:

I claim a tobacco fork, constructed and operating in the manner and for the purpose herein set forth.

40,272.—Water Gage for Steam Boilers.—George Mann, Jr., Ottawa, Ill.:

I claim, first, The cups, B B, attached and secured to the tube, A, by means of the caps, t t, screws, n n, and yoke, C, the whole combined substantially as herein specified.

Second, The float, D, and valve, t, applied within, and in combination with each other, and the gage tube, A, to operate substantially as and for the purpose herein specified.

40,273.—Means for Attaching Booms to Masts.—Melville McClain, Pemaquid, Maine:

I claim, first, The combination and arrangement of the interior collar, B, and exterior collar, C, with the boom, E, and the mast, A, substantially as and for the purpose set forth.

Second, The combination and arrangement of the hinged joint, D, with the boom, E, and the exterior collar, C, substantially as and for the purpose set forth.

Third, In the combination and arrangement of the friction rollers, h h, with the metallic box, H, and the collars, B and C, substantially as and for the purpose set forth.

40,274.—Machine for Jointing Shingles.—J. F. Parkes, Detroit, Mich.:

I claim, first, The combination of the hinged or falling table, B'' B'', with the circular saw, A'', as described.

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Second, Bringing the middle of the shingle or barrel heading, or nearly so, first to the saw.

Third, The use of the guard or gage-piece, E''.

Fourth, The whole machine constructed substantially as and for the purposes set forth.

### 40,275.—Attaching Bits to Braces.—Obed Peck, Windsor, Vt.:

I claim the jaw, C, hinged to the brace or handle, or connected therewith by a joint, in combination with the collar, D, provided with the annular inclined plane, c, at its lower edge, and the pin, d, attached to the brace or handle, substantially as and for the purpose set forth.

[This invention consists in the employment or use of a hinged jaw fitted in the bit end of the brace, and using in connection therewith a collar which is placed on the bit end of the brace, and provided with an annular inclined plane at its inner end, which acts against a line attached to the brace, all being arranged in such a manner as to admit of the bit being readily secured in the brace or bit-stock or handle, and readily detached therefrom.]

### 40,276.—Apparatus for Attaching Pumps to Bungs of Barrels.—F. A. Pratt, Hartford, Conn.:

I claim the employment, in combination with the suction pipe of a pump, of a tapering sleeve, c, and a screw clamp, d, or their respective equivalents, so constructed and arranged as to secure the said pipe in the bung hole of a barrel, substantially in the manner hereinbefore specified.

I also claim forming the end of the suction pipe into one or more sharp points, in combination with a clamp for securing the said pipe in the bung hole of a barrel, substantially as and for the purpose hereinbefore set forth.

### 40,277.—Apparatus for Hatching Poultry.—G. F. Quick, Morsetown, N. J.:

I claim the arrangement of the devices of water tank, A, drum, B, pipes, C C, chambers, D, perforated drawers, G, and chicken house, H, when arranged and combined as herein described and for the purposes set forth.

### 40,278.—Rotary Engine.—Abraham Kansdell, Moscow, Mich.:

I claim the inclined planes, E E, with the eccentric bows, c c, thereon, the valves in the steam chest as arranged and operated by the lever, L, with its connecting parts, the steam chest with its system of valves as described, and the pistons and casing, the whole combined, constructed and operating as described.

### 40,279.—Valve for Life Boats.—Lewis Raymond, New York City:

I claim the combination of the shell of the boat, ball valve and jacket, substantially as described, the whole constituting a self-voiding boat.

### 40,280.—Apparatus for Washing Dishes and the like Table Furniture.—Gilbert Richards, Cummington, Mass., and Levi Alexander, Sherburne Falls, Mass.:

We claim the arrangement of the wheel or buckets, G, within the chamber that contains oth he dishes &c. and the washing water, so that by rotating said wheel or buckets a continuous stream of water shall be etted or arown gainst them whilst the dishes or other articles remain stationary, substantially as described.

### 40,281.—Corn Planter.—J. J. Rider, Wilton Junction, Iowa:—

I claim the combinations of the treadles, P P, straps, N N', operating lever, L, and slide bar, K (or their equivalents), with each other, and with the slides, H H, and seed-boxes, G G, substantially in the manner and for the purpose herein set forth.

When slides, H H, are placed within the seed-boxes, G G, of a corn planter, and actuated by means of treadles, P P, substantially as described, I claim combining said seed-boxes with markers or runners, A A, and covering forks, c c, substantially in the manner and for the purpose herein set forth.

### 40,282.—Fruit House.—E. C. Roberts, Salem, Mich.:

I claim, first, The construction of the chambers, I I J, when used in a building for the purpose and in the manner and form herein described,

Second, The combination of the chambers, I I J, with a double-walled and double-roofed house, constructed in the manner and form substantially as herein described.

### 40,283.—Harvester Finger.—E. P. Russell, Manlins, N. Y.:

I claim, first, Securing the steel plate, B, to the finger, A, by means of the countersunk hole, c, into which the metal forming the finger is cast.

### 40,284.—Device for Raising Yeast.—A. A. Sage, Memphis, Mich.:

I claim an apparatus or device for raising yeast, composed of the case or vessel, A, provided with double walls, in connection with the cups or vessels, C D, placed within A, and all arranged substantially as specified.

[The object of this invention is to obtain a simple and economical apparatus or device, by which yeast may be raised without the aid of a fire, and thereby obviate the trouble and inconvenience of a fire in warm weather for the purpose specified.]

### 40,285.—Hoop Skirt.—L. S. Scofield, Belmont, Mass.:

I claim the application of the auxiliary dorsal strap, e, when so applied as to connect and fasten together the main tape, c, diverging taper, d d, and waist band, a, substantially as set forth.

### 40,286.—Molding Machine.—H. J. Seymour, Troy, N. Y.:

I claim the employment or use, in a machine for cutting moldings, of a supplemental curved bed, either concave or convex, corresponding in curvature with the curvature of the article on which the moldings are to be cut, and placed in such relation with the cutters as to serve as a guide for the work or article to be operated upon, substantially as herein described.

[The object of this invention is to obtain a simple means whereby curved articles, such, for instance, as backs of chairs, may have a molding cut on each edge, and by an ordinary rotating cutter.]

### 40,287.—Belt Cutting Machine.—Henry D. Smith, New York City:

I claim, first, The rocking or movable gage plate or its equivalent, for the purpose of throwing off the strips as they are cut.

Second, The combination of the movable gage plate with the packing, n, and stationary plate forming a groove, O, for the reception of the knife.

Third, I claim combining the cutting with the embossing, stamping, or marking operations so that they are effected simultaneously.

### 40,288.—Pendulum Sight for Cannon.—Robert Smith, Brooklyn, N. Y. Ante-dated Sept. 28, 1863:

I claim the construction of the pendulum in the manner herein shown and described, so that unimpeded vision or sighting may be had through or across the pendulum, as set forth.

The combination with the said pendulum of the adjustable graduated sight-staff, D, substantially in the manner herein shown and described.

The combination of the frame, B, staff, D, and pendulum, C, with the base, A, and the adjusting devices, all in the manner herein shown and described.

[The object of this invention is to so arrange the sight of a cannon that it can readily be adjusted to the position of the carriage, and that correct aim can be taken whatever the position of the carriage may be.]

### 40,289.—School Seat and Desk.—David I. Stagg, New York City:

I claim the arrangement of the seat desk board, D, with the arms, plates, d, and back, B, in the manner herein shown and described; that when the board, D, is turned down for a seat, its inner edge will pass under the back, B, all as set forth for the purposes specified

[This invention consists in attaching a seat to suitable supports or a settee, in such a manner that the seat may be turned upward and backward so as to project back of the settee and form a desk of any proper width, while the seat when used as a seat will be narrower than the desk and of a suitable width for a seat.]

### 40,290.—Support of Locomotives upon Car Trucks.—Allen S. Sweet, Jr., Detroit, Mich.:

I claim, first, Mounting a locomotive upon its truck through the aid of one or more cams, N N', arranged to roll transversely to the motion of the trucks, substantially as represented, and having their bearing surfaces formed substantially as described, and] for the purpose herein set forth.

Second, I claim the within described arrangement of chains, I and J, connecting the rear end of the truck frame, C, to the locomotive frame, A, substantially in the manner and for the purpose herein set forth.

### 40,291.—Combined Nippers and Pincers.—David Sweetman, Homer, N. Y.:

I claim the combination of the handles, A A, jaws, a a, hammer, B, and nipper blades, C C, the whole being arranged to operate substantially as and for the purpose explained.

[This instrument is principally designed for shoemaker's use and combines in one two of their most useful and necessary tools.

### 40,292.—Device for Stopping Bottles, &c.—Nathan Thompson, Abbey Gardens, St. John's Wood, England. Patented in England, Nov. 18, 1862:

I claim the combination of a cap with carrying a stopper and a screw acting thereon with the neck or mouth of a bottle or other vessel by means of double flanged pieces hinged together and to the cap, which double flanged pieces when closed together enter a groove in (or under a ring on) the neck or around the mouth of the bottle or vessel, and also come over the edge of the cap so as to confine the same, substantially as herein described.

### 40,293.—Closing Bottles, &c.—Nathan Thompson, Abbey Gardens, St. John's Wood, England. Patented in England, Nov. 18, 1862:

I claim the combination of a cap carrying a stopper and a screw acting thereon with the neck or mouth of a bottle or other vessel, by means of a flanged strip of metal connected with the bottle or vessel and under which the edge of the cap enters, and also by means of a flange on the cap which enters a groove or under a projecting ring in the neck or around the mouth of the bottle or vessel, the whole contrivance being substantially such as is described.

### 40,294.—Hot Air Register.—William Turton, Brooklyn, N. Y.:

I claim suspending the slotted rack, E (constructed with open slots and connected with fans, A, which have travelling studs or teeth, f f), by means of firm supports arranged above the base of the rack, and on both sides of the actuating part, G, so that the base of the rack has no frictional contact with the register box, substantially as set forth.

### 40,295.—Breech-loading Ordnance.—Franz Freiherr, Schilling Von Connstatt, Fort Delaware, Del.:

I claim the closing piece, d, of the shape specified, with arm, e, screw, k, collar, m, in connection with chain, g, substantially as herein described.

### 40,296.—Sewing Machine.—Jeptha A. Wagner, Poultney, N. Y

I claim, first, In a sewing machine combining the working parts, C E F G H and J, arranged and operating as described, the use of a frame or foundation composed of the parts, A B b b and a a, cast in one solid piece in their respective positions as shown in Figures 4 and 6, for the purposes described.

Second, In a sewing machine having the vibrating levers, G H, and E, arranged to operate as described, I claim the construction of the laterally adjusting plate, n, applied to the rear end of the change bar H, for the purpose of adapting the machine to work with different sized needles, substantially as described.

Third, A tapering flat-pointed looping needle, J, constructed with positive angles, o o, and three or more holes, s s s s2, through its flattened end whereby this needle is adapted to work well with fine or coarse thread and also can be set to compensate for any change in the length of the lower needle, J, substantially as described.

Fourth, The helical tension spring, d, applied to the needle bar, C, and arranged in a horizontal, or inclined plane, for the purpose of giving the desired tension to the upper thread, said spring being constructed substantially as described.

Fifth, In a machine operating as described, and having the three pivot points, g2 j and i, lever, E G, and change bar, H, I claim the adjusting slotted plate, n, spring, K, and cam wheel, F, operating as described, for the purpose of giving the required lateral movements to the looping needle, J, substantially as set forth.

### 40,297.—Medicine for Curing Foot-rot in Horses, &c.—Elhanan W. Wakefield, San Francisco, Cal.:

I claim the preparation and use of the medicine herein described for the purpose set forth, or any preparation, substantially the same which will produce the intended effect.

### 40,298.—Corset Busk.—Thomas Wallace, Jr., Ansonia, Conn.:

I claim the employment in corsets of metallic strips, which have their ends enlarged for the purposes, substantially as herein set forth.

### 40,299.—Hand Corn Planter.—H. B. West & C. A. Kellogg, Elyria, Ohio:

We claim none of the individual parts, but the combination of the seeding cylinder, a, having the cell, D, in but one, instead of several divisions, lever, f, and rod, g, with the seed dividing and distributing device, C H, when the whole are constructed and arranged to operate in the manner and for the purpose herein set forth.

### 40,300.—Cooking and Steam-heating Apparatus.—Edward Whiteley, Cambridge, Mass.:

I claim the fire-pots, B Q and U, in combination with the steam generator, C, and the flues, T K and J, commanded by suitable valves or dampers, arranged and operating in the manner and for the purpose substantially as herein described.

Also the horizontal water vessel, F, resting on the fire-pot, and not connected with the top plate, P, constructed and arranged in the manner substantially as set forth for the purpose specified.

Also in combination with the water grate, D, and water vessel, F, as described, I claim the fire-pot, B, surrounded by water and connected with the steam boiler, C, operating in the manner described for the purpose set forth.

Also placing the hot water tank or boiler, E, in a horizontal position above the fire, and so as to form a support for, or on one side of the flue, K, in the manner substantially as set forth.

Also the partition, S, with its opening, m, arranged and operating in the manner substantially as set forth for the purpose specified.

Also using the stay rods, l, as runners or ledges for the oven shelves, substantially in the manner set forth.

### 40,301.—Gardener's Stool.—Eliphalet Whittlesey, Mullica, N. J.:

I claim the construction and use of a stool so constructed as to be attached to the foot, thus making it portable while leaving the hands free, substantially as set forth in the above specification.

### 40,302.—Photographic Card Mounts.—Simon Wing, Boston, Mass.:

I claim the combination of a card, D (perforated and of the same thickness as the metallic plate pictures to be inserted), with an engraved or face card, A, and fly leaf, b, making a card mount for metallic plate pictures, as herein shown and described.

### 40,303.—Machine for Grinding and Polishing Lenses.—Manuel Witmer, South Pekin, N. Y.:

I claim grinding and polishing the lens upon the basin, L, when the basin has a turning motion, and the lens has an independent revolving motion of its own, and a vibrating, longitudinal and lateral motion, produced by the reciprocation of the carriage, in such a manner that said lens travels in a new part over the surface of the basin at each revolution, substantially as herein set forth.

In combination with the outer channel, u, I also claim the rim, r, arranged substantially as and for the purpose herein specified.

I also claim the combination and arrangement of the jointed frame, H, bow, M, carriage, E, and adjusting spring, N, substantially as herein set forth.

I also claim the special arrangement and construction of the whole machine, substantially as described.

### 40,304.—Window Slat Fastener.—Wm. H. Andrews, New Haven, Conn., assignor to himself and Charles H. Hurd, New Rochelle, N. Y.:

I claim the spring or catch, D, secured to the frame, A, in combination with the slats, B B, as herein before set forth.

### 40,305.—Needle Wrapper.—Oliver H. Blood & F. C. Treadwell, Jr., (assignor to Oliver H. Blood), New York City:

We claim the improved needle wrapper, having a needle holder directly combined with it, substantially in the manner and for the purposes herein before described.

### 40,306.—Machine for Pegging Boots and Shoes.—J. Hamilton Brown, Boston, Mass., assignor to S. S. Bucklin, Brookline, Mass.:

I claim the method herein substantially described of uniting and securing the knife rod to the plunger, whereby the knife and its rod may be made in a single piece for the purpose set forth.

I also claim the construction of the knife rod and its arrangement relatively to the plunger so as to effect the bearing of the pin upon the spring, substantially in the manner and for the purpose set forth.

I also claim in combination with a knife that splits off the peg upon its upward motion, supporting the peg strip by the upper wall of the peg trough and holding it there by a spring beneath it as set forth.

### 40,307.—Steam Engine.—John Cook, Paterson, N. J., and Alba F. Smith (assignors to John Cook), Norwich, Conn.:

We claim, first, Simultaneously varying the throw of the pump plunger, M, and of the valve, K, by the single hand lever, J, or its equivalent, substantially in the manner and for the purpose herein set forth.

Second, We claim giving a variable throw to the pump plunger, M, and valve stem, L, which are rigidly connected and arranged, substantially in the manner and for the purposes herein set forth.

### 40,308.—Mode of Cutting Boots.—Seth S. Drew (assignor to A. D. & H. J. Drew), Dixon, Ill.:

I claim the boot pattern herein described when the legpiece is cut with vertical edges to form a vertical seam directly up the front of the boot leg as specified.

[The object of this invention is to cut the leather for boots in such a manner that the labor of crimping will be avoided, and a saving of stock or leather effected, and the boot made to fit snugly and smoothly to the foot.]

### 40,309.—Teeth for Threshing Cylinders.—R. B. Killin (assignor to C. Aultman & Co.), Canton, Ohio:

I claim a tooth for threshing cylinders having a screw shank, B, and a foot or brace, B'', through which a screw is passed into the wood of the cylinder, the whole being constructed and united to the cylinder in the manner and for the purpose substantially as set forth.

### 40,310.—Crockery Stilt.—Philip Pinton (assignor to himself, James Ford & Charles Leak), Trenton, N. J.:

I claim the above described cover, substantially as specified for the purposes set forth.

### 40,311.—Sewing Machine.—Geo. Rehfuss (assignor to C. S. Patterson, E. Pincus, A. Hart, M. Moore, A. Mitchell & H. H. Reed), Philadelphia, Pa.:

I claim the combination of the reciprocating eye-pointed needle, F, the looper, N, and loop holder, R, the whole being arranged and operating substantially as and for the purpose specified.

### 40,312.—Curb Bit.—Theophilus S. Smith (assignor to himself & Andrew W. Smith), Lowell, Mass.:

I claim the improved curb bit as made with the cross bar, A, so applied to the cheek levers, B B, as to be capable of revolving the rein, in manner and for the purpose substantially as described.

And I also claim the bit as so made and as having an auxiliary cross bar, C, arranged with respect to the cross bar, A, and extended from one cheek lever to the other, substantially in manner and for the purposes or objects as specified.

I also claim the arrangement of the headstall and check rein hangers, with respect to the cheek levers, B B, and the cross bar, A.

### 40,313.—Flour and Grain Elevator.—Henry Stanley (assignor to Stanley & Tarble), St. Johnsbury, Vt.:

I claim, first, The combination of the conducting trough or tube, F, and tube, H, with a rotary fan confined within the casing, E, and operated substantially as specified: employed to elevate or convey flour or grain to the cooling or airing receptacle.

Second, In combination with the aforesaid conducting tubes, F and H, rotary fan and casing, E, I claim the receiver, I J M, operated as described and partially covered with gauze or other porous material, for cooling and airing the article being treated previous to passing into the bolt, L.

### 40,314.—Gate Hinge.—James T. Watson [assignor to himself & Charles W. Woolen], Richmond, Ind.:

I claim holding the wing, B, to its place by the cap, D, and set screw, E, as described and for the purpose set forth.

### 40,315.—Grate.—John Watson, Jr., (assignor to himself, Jno. P. Lacksteder & Frank Lacksteder), Louisville, Ky..

I claim the box, A, provided with an open side, a, and a plate, B, arranged substantially as shown, or in an equivalent way, so as to be capable of being applied to a grate, to form a portable or removable heat-radiating device as herein set forth.

### 40,316.—Grain Drill.—J. B. Edgell, G. P. Martin, H. C. Kellogg & E. A. Alexander, Quasqueton, Iowa.:

I claim the arrangement of the vibrating laterally adjustable slide, F, having V-recesses, d, with the bottom, b, spring, H', lever, I, and hinged bar, H, in the manner herein shown and described.

[This invention relates to an improved seeding machine of that class which is designed for sowing seed broad cast, and it consists in the employment or use of a seed-distributing slide, provided at its upper or face side with V-shaped recesses and fitted within a hopper and operated in such a manner as to ensure an equal distribution of the seed; the whole forming an exceedingly simple, efficient, and economical machine for the desired purpose.]

## RE-ISSUES.

### 1,552.—Surface Condenser.—Daniel Barnum, New York City. Patented May 24, 1859:

I claim, first, The use of india-rubber grummit rings or the equivalent thereof, in recesses made in tube sheets and around tubes, for making perfectly tight compensating joints between tubes and tube sheets in surface condensers, substantially as and for the purposes specified.

Second, I claim making compensating joints between tubes and tube sheets with india-rubber grummit packing rings in the condensing water compartments of surface condensers, for the purpose of securing the combined action of the water and vacuum in preparing and holding the packing within the recesses and around the tubes when in operation, and thus maintaining perfectly tight joints, whether followers are or are not passing upon the packing, substantially as and for the purposes specified.

Third, I claim the method substantially as specified of making yielding joints between the tubes and tube sheets in the condensing water compartments of surface condensers, and of thus compensating the expansions and contractions in the tube by means of having a portion of india-rubber or other elastic packing immediately surrounding each tube free, so that its elasticity can yield longitudinally with the tubes and compensate for the varying lengths without causing the packing to slip on the metal, substantially as and for the purposes specified.

## DESIGN.

1,830.—Cauldron.—A. C. Barstow, Providence, R. I.

1,831.—Bottle.—Charles Lediard, Brooklyn, N. Y.:

1,832.—Parlor Stove.—R. Wheeler & S. A. Bailey, Utica, N. Y.:

1,833.—Cooking Stove.—R. Wheeler & S. A. Bailey, Utica, N. Y.:

**Models are required to accompany applications for Patents under the new law, the same as formerly, exception design patents when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.**

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# IMPORTANT TO INVENTORS.

## PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of businesspertainingto patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

### THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a fulldescription, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

### PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model of drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F nd Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

### HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical productions he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from $30 to $15. Other changes in the fees are also made as follows:—

| | |
|---|---|
| On filing each Caveat | $10 |
| On filing each application for a Patent, except for a design | $15 |
| On issuing each original Patent | $20 |
| On appeal to Commissioner of Patents | $20 |
| On application for Re-issue | $30 |
| On application for Extension of Patent | $50 |
| On granting the Extension | $50 |
| On filing a Disclaimer | $10 |
| On filing application for Design, three and a half years | $10 |
| On filing application for Design, seven years | $15 |
| On filing application for design, fourteen years | $30 |

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents or new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country we would state that we have acted as agents for at least WENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

### REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters &c.

### CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

### FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

### ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

## TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our reception of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
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## Binding the "Scientific American."

It is important that all works of reference should be well bound The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preparved by a large class of its patrons, lawyers and others, for reference some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

## Notes and Queries

H. S. R., of Wis.—You will find match-making machinery illustrated and described on page 113, Vol. IX. (old series) of the SCIENTIFIC AMERICAN

E. D., of Mich.—A patent could not be obtained for sharpening files by the use of acids. The practice has long been known.

J. D., of Nebraska.—We think you can purchase a windmill of Miles Greenwood, of Cincinnati. They are not to be obtained in this city.

J. M., of Ohio.—The scale or sand of iron castings is removed by a pickle of sulphuric acid and water, in the proportion of one in bulk of acid to ten of water. This is a great saving of tools, as the scale is vitreous in its nature and destroys cutting edges with great rapidity.

R. S. W., of N. Y.—You say that the sand cores burn away or stick to the metal in the holes of your castings, occasioning great trouble and waste of time and money to ream them out. Make a round steel drift pin; grind the face square like a punch; harden it and drive it through with a hand hammer. You will find this a better way than to ream or drill the holes.

L. B., of Conn.—Don't grind the tool so acute, and then it will not "dig in;" tools for brass require a lower angle of cutting-edge than for iron.

H. De W., of N. Y.—Tallow and oil will not unite with the carbonate of soda and form soap by boiling in an open vessel, but under pressure in a close boiler soap may be formed with the carbonate, because the high temperature will expel the acid from the soda.

E. N. F., of Ill.—The owner of a county or State right in a patent has a right to sell machines only in his own territory. He is not obliged to ask the purchaser if he is to use it within the jurisdiction of his territory, but if the purchaser takes it into a county owned by another party he has no legal rights to operate it.

R. S. D., of N. J.—Cast iron may be decomposed in acid and the carbon in it left disengaged. The mode of doing this is to use a piece of cast iron as an electrode of the positive pole of a Bunsen battery, with platinum for the opposite pole, then placing it in hydrochloric (muriatic) acid. The current should be feeble or the carbon will be disengaged, hence the carbon must be immersed moderately in the acid. The iron gradually dissolves, while the carbon remains and preserves its original form.

H. W., of Wis.—Soapstone dust has been frequently used in the journal boxes of heavy shafting exposed to high heat, but it is not suitable for carriage axles, such as those of locomotives, for which you have suggested its use. It may be employed mixed with grease, soap or oil, and formed into a greasy paste.

T. T. W., of Pa.—Locomotives are employed in some of the English collieries. The gage of the rails is quite narrow, being within three feet. The engines have cylinders about 7 inches diameter and 12 inch stroke; wheels 2½ feet—four coupled—and the whole weight about 8 tuns. An engine of this capacity takes a load of 14 tuns up an incline of 1 foot in 30.

J. R. S., of England.—As you intend coming to the United States to introduce your improved machine, we advise you not to have it built in England, but to have it built from your drawings in this country. You will find parties here who will construct any kind of machinery for you from working drawings.

B. H. B., of Pa.—We have made use of the communication and sketch you so kindly forwarded to us, as you can see by referring to page 270 of the present number.

O. S., of Conn.—Blue vitriol (sulphate of copper) is manufactured from ore in Frederick county, Maryland, but to what extent we cannot inform you at present. About 1,000,000 pounds of this copper salt are consumed in this country annually. It can also be made from old scraps of copper, by dissolving them in dilute sulphur acid.

F. W. B., & Co.—A strong solution of alum applied to your wooden staircase will prevent it from rapid ignition and burning with flame, in case of fire on your premises. An application of the sulphate of ammonia, the tungstate of soda or the silicate of soda, will effect the same object, but alum is the cheapest substance.

### Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, Oct. 14, to Wednesday, Oct. 21, 1863:—

G. S., of N. Y., $25; J. J. L., of N. Y., $25; D. & K., of N. J. $25; J. L. P., of N. Y., $16; A. W., of N. Y., $45; J. G., of R. I. $45; Z. W., of N. J., $41; O. R. H., of Ohio, $45; H. T. M., of N. Y., $16; H. B. & G. A. M., of Mich., $20; B. W., of N. J., $20; J. S., of N. Y., $20; S. L. H., of N. Y., $20; E. B. R., of N. J., $20; G. S. C., of N. Y., $20; G. M., of Vt., $45; S. T., of Cal., $20; J. M., of Cal., $16; S. H., of N. Y., $16; C. H. G., of Mass., $15; H. H. H., of N. Y., $22; B. & B., of Wis., $10; H. & S., of Cal., $30; B. & K., of Ohio, $16; A. Van G., of N. Y., $25; A. H. W., of Iowa, $16; E. St. J., of N. Y., $25; E. McG., of Minn., $25; S. B. H., of Mass., $25; H. B., of La., $16; J. A. H., of Mass., $61; J. W., of Iowa, $15; J. F., of N. Y., $16; D. B. N., of Ind., $12; J. S. G., of Iowa, $25; D. E. H., of Mass., $25; J. G., of Ind., $25; E. K., of Pa., $11; F. S. D., of Ill., $25; R. D., of Pa., $16; W. E. W., of N. Y., $16; S. R. B., of Wis., $21; J. K., of N. Y., $30; W. & M., of Germany, $27; I. B., of N. J., $25; S. & H., of Mich., $20; S. C. H., of Mass., $45; G. & G., of N. Y., $20; G. F., of N. Y., $16; G. P. G., of N. Y., $32; W. B. R., of Mass., $16; F. J. T., of Md., $25; F. D. D., of Ohio, $25; J. G. T. E., of Mich., $30; J. B. H., of R. I., $16.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgement by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, Oct. 14, to Wednesday, Oct. 21, 1863:—

W. & S., of Pa.; G. S., of N. Y.; J. J. L., of N. Y; D. & K., of N. J.; Z. W., of N. J.; D. B. N., of Ind.; J. T. G., of Iowa; J. G. of Ind; E. St. J., of N. Y.; A. E. McG., of Minn.; S. B. H., of Mass.; C. S. W., of Mass.; A. Van G., of N. Y.; F. S. D., of Ill.; J. K., of N. Y.; W. & M., of Germany; I. B., of N. J.; E. K., of Pa. A. P. B., of N. Y.; F. D. D., of Ohio; J. E., of N. Y. (2 cases).


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WAR DEPARTMENT,
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The guns will be delivered at, and removed from, the establishment where the work is to be done at the cost of the United States.

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The guns are to be turned down to a true cylinder for the length of twenty-seven inches from the rear of the base ring, prepared to take a band of the best wrought-iron, the interior diameter of which will be twenty inches, and its thickness three inches.

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The work is to be done to the entire satisfaction of the officer who will be appointed to superintend it; and payment will be made in full for each gun upon his certificate of inspection and receipt.

Proposals will state the price per gun for the whole operation; describe in detail the manner in which it is proposed to put on the band; the number they will band per month; and the time which will be required to do the whole work. The method and the time required for doing the work, as well as the price, will be important elements in considering the bids and awarding the contract.

No bids will be considered from any parties but such as are actually engaged in the manufacture of iron and heavy machinery, and who are, in the opinion of this Department, fully prepared to execute the work. In the case of parties not known to this Department, evidence to the foregoing effect must accompany the proposal

Bond, with satisfactory sureties, to the amount of fifty per cent. of the bid, will be required for the fulfilment of the contract; and the Government reserves the right to reject any or all bids, if deemed unsatisfactory.

Proposals will be endorsed "Proposals for Banding 42 Pounders," and will be addressed to Brigadier-General George D. Ramsay, Chief of Ordnance, Washington City.

GEO. D. RAMSAY,
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16 3

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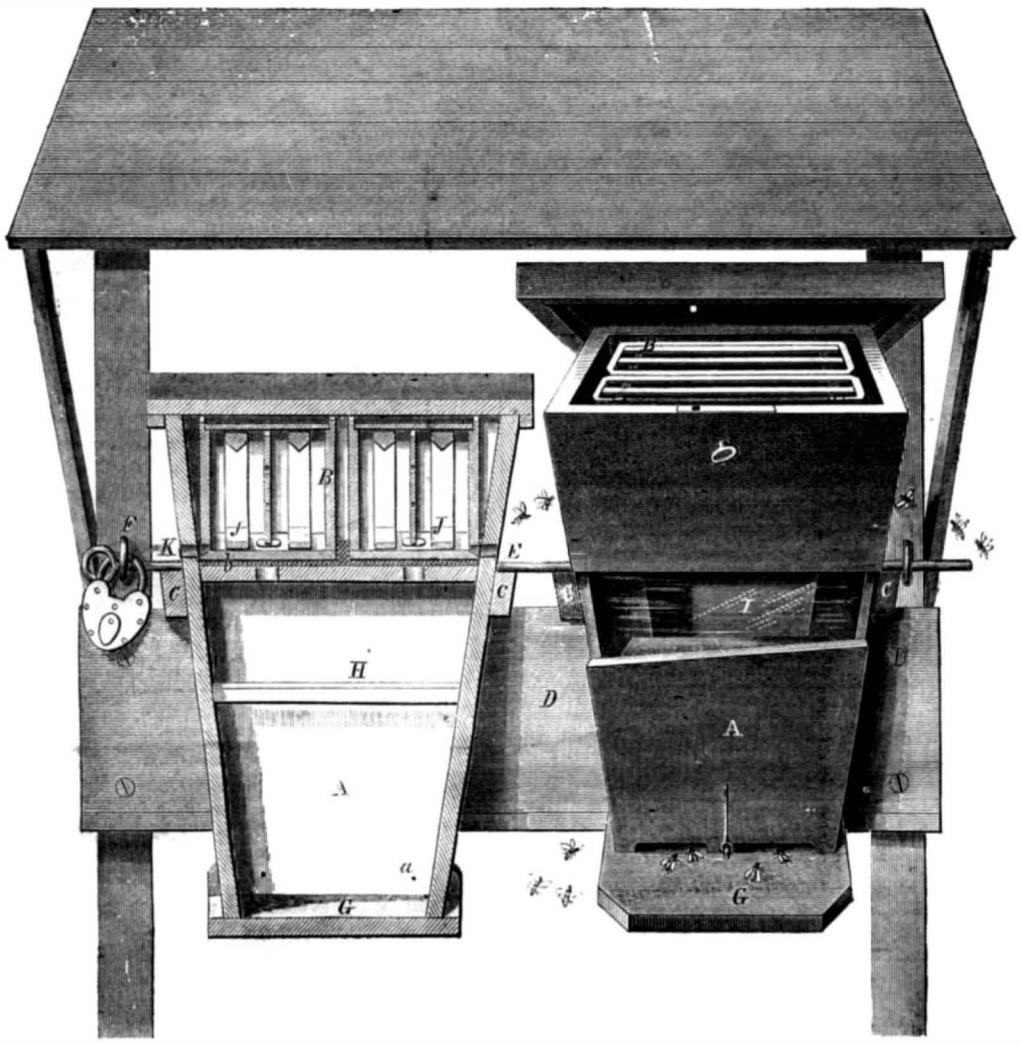
### Improved Beehive.

Increased attention is being given annually to the care and cultivation of bees; and it would seem to be one of the most profitable pursuits at the prices which are now obtained for honey in this city—from 30 to 35 cents per pound at retail. With properly-constructed hives, the insects will work year after year, and produce their much-esteemed luxury, and they only require propagating in sufficient numbers, and unlimited food to be the source of handsome income. The beehive herewith illustrated is well arranged, and is remarkable for the simplicity of its construction; if it should be found to embrace all the advantages claimed for it by the inventor it will certainly give a new impetus to bee culture.




## ANDRUS'S PATENT BEEHIVE.

It is asserted by the inventor that in this hive he can propagate colonies of bees without waiting for them to swarm; this is done by affording them plenty of room to work in, when they will continue to make honey without congregating periodically. The construction of the hive is extremely simple; it being merely a case, A, of tapering form, containing the honey boxes, B B; this case is provided with parallel bars, C, which have two iron pins in the back ends of them (not shown in the engraving) which enter the edge of the board, D; there is also a staple at the back of the case through which the iron rod, E, is run, said rod terminating in an eye; through this eye and another staple, F, the hasp of a padlock is inserted, and the hives are thus secured, so that nothing short of actual violence or a duplicate key can remove them; while in case of force the bees would rush out and protect themselves most effectually. The board, D, is fastened to the upright posts which sustain the roof of the shed; thus the beehives are always under shelter. Two or more sets can be arranged, back to back, on the same board. The bottom, G, of the hive is shown attached to the main part by a hook and staple in front; behind them are no hinges, but two iron pins, inserted as at the small holes, *a*, in the section. These pins allow the bottom to be completely detached, when the staple is unhooked. This is found convenient for removing worms, which are said to be extremely troublesome, and the greatest pest to be encountered in the portion of the country where the inventor resides; as many as twenty and thirty of them being collected every morning from the split elders placed on the bottom to entrap them. The cross-bar, H, is found sufficient to sustain the comb in this hive, as by the inclination of the case the bees make all the combs with the edge to the front and back. The glass, I, is closed ordinarily by a slide, but we have removed it in our engraving to show the arrangement in this respect. The cover of the hive is shown raised; it is provided with a lock and key to prevent premature removal of their contents by persons not entitled to the same. The honey boxes have sliding glass covers and are divided by a slatted partition, the lower edges of which are directly over the holes for the bees, so that they can obtain access to both compartments through one entrance. The boxes are also provided with a comb frame. These hives are made tapering, so that the end of one will fit in the top of another, and when a colony is to be hived the full hive is set over an empty one, the honey boxes being removed. When it is desired to have bees work in the boxes, the hive containing them should be separate from any other by closing the aperture with wire cloth; the bees are then forced to go up through the boxes to get out, and, consequently, will at once, if the swarm is in a suitable condition, go to work and fill them. The wire cloth, *b*, is only placed over the upper holes to keep the bees from working in the boxes until they have a sufficient quantity in the box below to winter upon. There are also other openings at K through which the bees obtain access to the boxes. When the old comb is to be removed, the bees are allowed to enter the lower hive and are secured therein; the front side of the full hive may then be taken out by removing the screws, and the honey boxes may be easily removed, as they have so much play or space that they cannot jam or stick fast. These are the principal details of this hive.

The patent for this invention was procured through the Scientific American Patent Agency, on Aug. 25, 1863, by J. H. Andrus, of Almont, Mich. For further information address him at that place.

### Beef Factory.

A correspondent of the *Maine Farmer*, writing from Bluehill, Maine, says:—"The beef factory here, owned by Messrs. Wm. Underwood & Co., of Boston, will commence operations about the first of October next, when the meat will be scientifically cut from the quarters of twelve or fifteen fat oxen per day, seasoned with salt and pepper, put into tin cans holding four pounds each, sealed up and consigned to baths of boiling water, where they remain about six hours. None of the juices of the meat can escape, the can being air tight when cooked. When cooled and the can opened, you find the meat immersed in a rich jelly and very tender. It is the *ne plus ultra* of meat cooking, affording more nutriment than when cooked any other way, and will keep any length of time in any climate. The United States Navy receives the most of it."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